

**Provision of a comprehensive curriculum to rural high school students through  
technology: A case study of a provincial virtual school in Canada**

By

©Nadeem Saqlain

A Dissertation submitted to the School of Graduate Studies in partial fulfilment of the  
requirement for the degree of Doctor of Philosophy

**Faculty of Education**

Memorial University of Newfoundland

**June 2018**

St. John's, Newfoundland and Labrador

### **Abstract**

This study examined the nature of the Center for Distance Learning and Innovation (CDLI) in Newfoundland and Labrador. The purpose of this case study was to describe the genesis and evolution of the online distance program provided by CDLI. The primary goal of this research was to investigate how CDLI has attempted to equalize educational opportunities for rural high school students in the province.

Data were collected through interviews and document analysis. This dissertation reports on a case study involving 14 participants purposely selected in order to gain a better understanding of the case. The study's participants were representative of all areas of CDLI. The data in this study were also generated through document analysis. The documents for analysis included the official CDLI website, and reports and papers published on CDLI in the past.

The data were analysed by using NVivo software. Findings were presented in themes. Seven themes were presented and included the genesis of CDLI, pilot year, growth and development, evolution of technology, E-teachers, pedagogy, and continuing challenges. The themes were further divided into categories.

Future research is needed to investigate students' perceptions on learning through CDLI, to understand how students are selected for CDLI courses, to examine the impact of CDLI students on fellow classmates, to investigate the responsibilities of m-teachers, to

investigate the issues host schools face due to CDLI courses and, finally, to examine the effectiveness of CDLI courses.

## **Acknowledgements**

### **In the Name of Allah, the Most Gracious, the Most Merciful**

A note of acknowledgement and thanks is offered to the many individuals who supported me during this academic journey. First and foremost, I would like to thank Dr. Dennis Mulcahy, Faculty of Education, Memorial University of Newfoundland, for his constant support and dedication as my doctoral supervisor. I have been very fortunate to work closely with and learn from Dr. Mulcahy as a master's student and as a doctoral student. Dr. Mulcahy has been a wonderful mentor.

I would also like to thank the members of my doctoral committee: Dr. Barrie Barrell, Faculty of Education, Memorial University of Newfoundland and Dr. Michael Barbour, College of Education and Health Services, Touro University, California, for their thoughtful feedback on my dissertation and their encouragement over the completion of my research.

A depth of gratitude goes to members of the Faculty of Education at Memorial University and many others whose words of encouragement kept me motivated. In particular, I am thankful to: Dr. Kirk Anderson, Dr. Ursula Kelly, Dr. Amarjit Singh, Dr. Tim Seifert, Dr. Henry Schulz, Dr. Connie Morrison, Dr. Gabrielle Young, Dr. Saiqa Azam, Dr. Heather McLeod, Dr. Rhonda Joy, Dr. Jerome Delaney, Dr. Noel Hurley, Dr. John Hoben, Dr. Cecile Badenhorst, Dr. Gerry White, Dr. Jennifer Anderson, Dr. Elizabeth Murphy, Dr. Elizabeth Yeoman, Dr. Rob Kelly, Dr. Fawaz Alqarni, and Ms.

Barbara Mulcahy. They have supported the completion of this dissertation in different ways. I would also like to thank Malik Khalid Latif, my school teacher, who kept me motivated during the early years of my learning.

My deep appreciation goes to the clerical staff of the Faculty of Education at Memorial University, particularly Ms. Tina Hunt, Ms. Jillian Gosse, Ms. Darlene Flight, Ms. Nancy Bishop, Ms. Susan Hicks, Ms. Rose Cross, and Ms. Caitlin Power.

I am grateful to Mr. Maurice Barry, Faculty of Education, Memorial University of Newfoundland, for his special support and guidance with this research project. I am also very grateful to the present and the former employees of CDLI who participated in my study and generously volunteered their time to help me gain insight into their online teaching and learning environment.

Finally many thanks to my beloved wife Asma Nadeem for her patience. I would like to especially thank my sister Unsa Zahir and her family, my brother Naeem Saqlain and his family, as well as my relatives and friends for their support.

## **Dedication**

This work is dedicated to

Raja Shafait Ali

Nazir Begum

Asma Nadeem

Naeem Saqlain

Unsa Zahir

## Table of Contents

Abstract	<i>i</i>
Acknowledgments	<i>iii</i>
Dedication	<i>v</i>
Glossary of Terms	<i>xiv</i>
List of Appendices	<i>xvii</i>
<b>1. Chapter One: Introduction</b>	<b><i>1</i></b>
1.01 Early Developments in Distance Education in Newfoundland and Labrador	<i>2</i>
1.02 School on Wheels	<i>2</i>
1.03 The Correspondence Division	<i>3</i>
1.04 School Radio Broadcasts	<i>4</i>
1.05 Correspondence Courses	<i>4</i>
1.06 Technology Based Distance Education	<i>5</i>
1.07 Small Schools Study Project	<i>5</i>
1.08 Telemedicine and Educational Technology Resources Agency (TETRA)	<i>7</i>
1.09 Centre for Distance Learning and Innovation (CDLI)	<i>8</i>
1.10 Purpose of the Research	<i>9</i>
1.11 Research Questions	<i>10</i>
1.12 Methodology	<i>10</i>
1.13 Significance of the Study	<i>11</i>

1.14	Delimitations and Limitations	12
1.15	Organization of the Dissertation	13
<b>2.</b>	<b>Chapter Two: Literature Review</b>	<b>14</b>
2.01	Defining K-12 Online Learning	15
2.02	Types of K-12 Online Learning	17
2.03	The Growth and Development of K-12 Distance Learning	18
2.04	Research on K-12 Online Learning	23
2.05	Rationale for K-12 Online Learning	24
2.06	Virtual School Management	27
2.07	Technology Usage	29
2.08	Role of the Online Teacher or E-teacher	30
2.09	K-12 Online Learning Challenges	33
2.10	Student Support	35
2.11	Appropriateness of K-12 Online Learning for All Learners	37
2.12	Necessary Attributes for Successful Online Learning	38
2.13	Achievement	40
2.14	Retention Rates	41
2.15	Motivating Online Learners	43
2.16	Chapter Summary	44
<b>3.</b>	<b>Chapter Three: Research Design and Methods</b>	<b>46</b>
3.01	Research Design and Methods	46



3.02	The Case	50
3.03	Ethical Considerations	53
3.04	Sampling and Participants	54
3.05	Data Collection	56
3.06	Interviews	56
3.07	Telephone Interviews	57
3.08	Face-to-Face Interviews	58
3.09	Documents	59
3.10	Data Analysis	60
3.11	Interviews and Documents	61
3.12	Trustworthiness	63
3.13	Researcher Positioning	65
3.14	Chapter Summary	67

#### **4. Chapter Four: Findings 68**

4.01	Genesis of CDLI	69
4.02	The Legacy Model of Distance Education	70
4.03	The Vista Project	73
4.04	The Establishment of a Ministerial Panel	74
4.05	Consultation and recommendations	74
4.06	Pilot Year	77
4.07	Initial Administrative Team	78

4.08	Pilot Year Key Events	79
4.09	No Guidelines to Follow	83
4.10	Initial E-teachers	83
4.11	A blended model of synchronous and asynchronous interaction	83
4.12	Technology and Connectivity	85
4.13	Learning to Use Technology	86
4.14	Equipment and Tools	86
4.15	Visiting Pilot Schools	87
4.16	School Based Support: From M-Teacher to M-Team	89
4.17	Two Time Zones Issue	91
4.18	Conclusion	92
4.19	Growth and Development	92
4.20	Equipment Distribution	94
4.21	Student Selection	94
4.22	School-Based Issues	95
4.23	Student use of offline time	95
4.24	Demands on school-based teachers	96
4.25	Dealing with different principals	96
4.26	Student discipline issues	96

4.27	A space to learn	97
4.28	Current Organization of CDLI	97
4.29	Evolution of Technology	98
4.30	E-teachers	102
4.31	E-teacher Characteristics	103
4.32	Participants' Views on E-teaching: A Challenging Job	104
4.33	Student-teacher separation	106
4.34	Student lost instructional time	107
4.35	Students not working during asynchronous periods	107
4.36	E-teacher Recruitment	108
4.37	Teacher Training, Professional Development and Teacher Evaluation	110
4.38	E-teachers' Qualifications	112
4.39	Synchronous and Asynchronous	113
4.40	Pedagogy	115
4.41	CDLI Courses and Classes	115
4.42	Teaching Strategies & Teacher's Role	119
4.43	Student Assessment	121

4.44	Lab work	122
4.45	Differentiated Instruction (DI)	123
4.46	Offline Support Provided by CDLI	124
4.47	Technical Support	124
4.48	Academic Support	125
4.49	School Based Support	125
4.50	Guidance & Counselling Services	127
4.51	Tutoring Work Experience Program: (TWEP)	128
4.52	Free of cost tutoring	128
4.53	Student Dropout	129
4.54	Student Characteristics	129
4.55	Continuing Challenges	131
4.56	Connectivity	131
4.57	Funding	131
4.58	Dealing with Ongoing Challenges	132
4.59	Per Class Student Limit	132
4.60	Chapter Summary	133

## **5. Chapter Five: Summary, Discussion, Conclusion, and Recommendations 135**

5.01	Summary	135
------	---------	-----

5.02	Chapter One: Introduction	135
5.03	Chapter Two: Literature Review	138
5.04	Chapter Three: Methodology	139
5.05	Chapter Four: Findings	142
5.06	Discussion	142
5.07	Meeting the Programming Challenges of Small Rural High Schools	143
5.08	Pilot Year	146
5.09	Program Growth and Development	148
5.10	E-teachers	148
5.11	Student Selection	150
5.12	Pedagogy	151
5.13	Technology	154
5.14	Continuing Challenges	154
5.15	Implications for Practice	157
5.16	Recommendations for Future Research	158
5.17	Conclusion	159

**6. References    161**

**7. Appendices    184**

7.01	Appendix A: Letter to the Director of CDLI	184
7.02	Appendix B: Letter to the participants	186
7.03	Appendix C: Informed consent form	187
7.04	Appendix D: Interview questions	192
7.05	Appendix E: Documents for analysis	194
7.06	Appendix F: Research Ethics Approval Letter	195

## Glossary of Terms

**Asynchronous:** When learning does not occur at the same time and in the same place.

**Audacity:** Audacity is a free open-source digital audio editor and recording computer software application.

**Back-end systems:** Back-end systems include Learning Management Systems and synchronous tools.

**Blackboard Collaborate (BBC):** Blackboard Collaborate is a tool that supports the real-time virtual classroom. It is a real-time video conferencing tool that lets you add files, share applications, and use a virtual whiteboard to interact.

**Blended course:** A course offered through two modes of instruction: face-to-face and online.

**Blended learning:** In this form of learning, students study partly in school and partly through online delivery.

**Brick-and-mortar schools:** Traditional schools.

**Camtasia:** Camtasia is software that helps create video tutorials and presentations directly via screen cast.

**Captivate:** Captivate is a tool used for creating e-learning content.

**CDLI:** The Center for Distance Learning and Innovation. CDLI offers high school courses through online learning.

**Course enrolment:** The number of students registered in a course.

**Credit recover:** A student passes and receives credit for a course that he or she previously attempted but did not succeed in earning academic credit towards graduation.

**Distance Education:** In this form of education, students may not always be physically present at a school and are most often separated from each other.

**Eduweblabs:** A computer program that helps to facilitate virtual labs. This program gives students an opportunity to manipulate laboratory equipment, gather data, and process the data.

**E-learner:** A student who takes courses over the Internet.

**Elluminate Live!:** A web conferencing program developed by Elluminate Inc. that supported real-time online discussions. Elluminate Inc. was acquired by Blackboard Inc. and became Blackboard Collaborate. A Blackboard Collaborate Ultra version also exists.

**E-teacher:** A teacher who delivers instructions over the Internet.

**ICLT:** An abbreviation of Information Communication and Learning Technologies.

**Knowledge Forum:** Knowledge Forum is an asynchronous technology that facilitates collaborative knowledge-building strategies, textual and graphical representation of ideas, and reorganization of knowledge artifacts.

**Learning Management System (LMS):** The technology platform through which online courses are delivered.

**MeetingPoint:** MeetingPoint is an audio and video conferencing application.

**Multimedia Learning Objects:** Objects or small “chunks” of learning content that focus on specific learning objectives such as text, images, video, and audio clips.

**M-teacher (mediating-teacher):** A school-based teacher who provides on-site support to online learners.

**M-team (mediating-team):** A group of different teachers at a school who provide on-site support to online learners.

**NetMeeting:** NetMeeting was an audio and video conferencing application.

**NLTA:** The Newfoundland and Labrador Teachers’ Association.

**Online distance education:** In this form of education, the instructions and content are delivered over the Internet.

**Online course:** A course offered over the Internet.

**Performance-based funding:** This funding model links funding for public education programs with measureable student performance.

**Recorded classes:** CDLI synchronous classes are recorded. Students have access to classes if they have missed them or want to revisit classes or assignments.

**STEM~Net:** Educational networking in Newfoundland and Labrador for teachers in the primary, elementary, and secondary school system.



**Synchronous:** When instruction occurs at the same time for all students regardless of where they are located.

**TETRA:** The Telemedicine and Education Technology Resource Agency. TETRA facilitated the delivery of distance health and learning programs at the Health Sciences Complex at Memorial University in St. John's.

**Tutoring for Tuition:** Tutoring for tuition is a free service provided after hours for students in Newfoundland and Labrador.

**Tutoring Work Experience Program (TWEP):** TWEP is a free online tutoring service that teaches high school students outside of regular school hours in Newfoundland and Labrador.

**Tutor's Edge:** Tutor's Edge was a software program that had two-way audio and whiteboard features. It was later rebranded as VClass.

**VClass:** VClass was an online learning platform designed for delivering online courses, later rebranded as Illuminate Live!

**Virtual Teacher Center (VTC):** The Virtual Teacher Center. The VTC was established as a partnership between the Department of Education and the Newfoundland and Labrador Teachers' Association (NLTA) to develop and deliver online professional development for primary, elementary, and secondary school educators throughout the province.

**WebCT:** WebCT was software that facilitated asynchronous learning. It was replaced with Desire2Learn, which is now known as Brightspace.

## **List of Appendices**

Appendix A: Letter to the Director of CDLI

Appendix B: Letter to the participants

Appendix C: Informed consent form

Appendix D: Interview questions

Appendix E: Documents for analysis

Appendix F: Research Ethics Approval Letter

## **Chapter One**

### **Introduction**

Newfoundland and Labrador, the most easterly province in Canada, entered Confederation and became part of Canada in 1949. The total area of Newfoundland and Labrador measured 405,212 km<sup>2</sup>. According to the Government of Newfoundland and Labrador (2016), the total population of the province numbered 530,128. Approximately 50% of the population lived in the metropolitan St. John's area. The rest of the population lived in a few small towns, including Corner Brook, Grand Falls-Windsor, and Gander, and in the many small and often remote communities scattered throughout the province (Barbour, 2005). Some of the more rural communities were only accessible by plane or by boat. During the 2015-2016 school year, approximately 63% of the province's 262 schools were located in rural areas of the province and half of the schools in the province had less than 200 students (Newfoundland and Labrador, 2015-2016). Dodd, Kirby, Seifert, and Sharpe (2009) reported that "about one third of the public schools are designated as necessarily existent" (p. 1), meaning they could not be closed because the distance from other schools was so great that bussing was not a feasible option (Barbour & Mulcahy, 2009; Mulcahy, 2012).

In the rural areas of the province, many small schools have been limited in their course offerings because of the small number of teachers on staff and the occasional difficulty with teacher recruitment and retention, especially of specialist teachers (Mulcahy, 1996; Shortall & Greene-Fraize, 2007). The dramatic decline in rural

population over the last 25 years has impacted all aspects of small schools (Mulcahy, 2007). Providing quality K-12 education in such a large, sparsely populated province with limited resources has always been a great challenge for the Government of Newfoundland and Labrador. One way the province has met this challenge has been through the introduction of various alternative forms of program delivery, in particular, distance education.

### **Early Developments in Distance Education in Newfoundland and Labrador**

Given the province's geographical and demographical challenges, several efforts have been made by the Department of Education in the past to provide supplementary educational opportunities to students in rural communities, namely through School on Wheels, correspondence courses, and radio.

#### **School on Wheels**

The School on Wheels program was not a traditional form of distance education, but an alternate or supplementary form of program delivery that began in the 1930s. Noseworthy (1997) reported that many children from several remote communities along the main line of the Newfoundland Railway had no access to schooling. He also noted that this situation generated discussion among the Department of Education and the Newfoundland Railway. As a result, a railcar was used to travel along the railway track and teach the children in small communities who lived close by. This program was named "School on Wheels." The Department of Education, the Newfoundland Railway, and the Anglo-Newfoundland Company jointly launched the project. The Department of

Education was responsible for educational materials, the Anglo-Newfoundland company provided a railcar, and the Newfoundland Railway outfitted the car so it could serve as a mobile school. The railcar had a school section, as well as living quarters for the teacher, and served communities from 1936 to 1942. During that period, the school car would stop at specific destinations for a set number of days while the teacher, Frank Moores, held class and assigned homework. On a return visit, he would correct homework and assign the next set of work to be done.

### **The Correspondence Division**

In 1937, the Department of Education investigated the possibility of initiating correspondence programs in communities that were too small to maintain a school. Arrangements were made with the Nova Scotia Department of Education, whose correspondence courses had been offered successfully for many years (Newfoundland Government, 1939). According to a Department of Education report (1940), information regarding correspondence courses was sent to parents in a number of small communities. Subsequently, the Department of Education established a Correspondence Division and approximately 100 children from remote communities were served through correspondence courses in the first year of the program. The correspondence courses were offered to students from Grades 1 to 8 (Newfoundland Government, 1942). Lessons were prepared in mimeographed form and students' work was returned by post for evaluation (Newfoundland Government, 1940). The following year, enrolment increased to 150 students. Plans were made to extend the program by appointing itinerant teachers (Newfoundland, 1941). Finding capable local volunteers to supervise the children was a major impediment in the correspondence program (Noseworthy, 1997). Therefore, the

itinerant teachers were appointed to supervise the work of children from a number of communities where the correspondence program operated (Newfoundland, 1942). No public documents exist to show the exact end date of the program. However, the annual report of the Department of Education (1946) indicated that the Correspondence Division decreased its educational activities due to various factors, including lack of mail service, illiteracy, and lack of parental interest.

### **School Radio Broadcasts**

In 1950, the Audio-Visual Division of the Department of Education became responsible for the production and promotion of school radio broadcasts. During that year, Newfoundland actively participated in the planning and production of the Atlantic School Broadcasts for the first time (Newfoundland Government, 1952). The aim of the broadcast was to supplement the curriculum program of studies in Music, Physical Fitness, Oral French, English, Health, Social Studies, Science, and Vocational Guidance. The provincial government was responsible for providing financial aid to school boards for purchasing the radio-phonographs. In addition to radio, 10,544 documentary films and film strips were circulated free of charge to schools, colleges, and other organizations. In 1954, in collaboration with the CBC, radio was directly used to assist teachers and students on the Newfoundland course of study (Newfoundland Government, 1955). The school radio broadcasts continued into the 1970s.

### **Correspondence Courses**

In the 1950s, the concept of distance education by correspondence was revisited. A committee of supervising-inspectors of schools was established by the Deputy Minister of Education. The committee decided that a program of high school correspondence

courses should be introduced into smaller schools in order to lessen the curriculum burden and to try to equalize educational opportunities for all youth living in smaller communities (Newfoundland Government, 1956). The use of correspondences courses with radio integration was also recommended (Newfoundland Government, 1957). The correspondence courses program was initiated in 1958. According to a report of the Department of Education (1959), in its first year of operation, more than 200 students from one- and two- room schools were enrolled in correspondence courses for Grade 9. Later, correspondence courses for Grade 1 to Grade 8 were introduced free of charge to the children of lighthouse keepers, handicapped children, and children living where regular schools did not exist (Newfoundland Government, 1963). The correspondence courses program served rural students from various communities. With the introduction of scholarships and bursaries, and the centralization of schools, enrolment in the correspondence courses program gradually declined (Newfoundland Government, 1960). As a result, the correspondence courses program was discontinued toward the end of 1963 (Riggs, 1987).

### **Technology Based Distance Education**

#### **Small Schools Study Project**

Frank Riggs, an education professor at Memorial University, was appointed to conduct a study of small schools in the province in 1986. *The Report of the Small Schools Study Project* was published in January 1987. According to Piper (1997), the primary purpose of the project was “to investigate problems peculiar to small schools with an aim toward developing proposals to enhance educational opportunities for students in these schools” (para. 2). The challenges and problems associated with small schools were the

main focus. The data were obtained from 160 teachers and principals from the smallest schools and 200 random teachers and principals from remaining schools. Riggs (1987) reported on the various challenges confronting small rural schools including (a) limited curriculum; (b) insufficient staff; (c) inadequate guidance; and (d) lack of instructional materials, as well as emphasizing the critical problems of (e) teacher recruitment and retention in remote communities. Submitting his report to the provincial government, Riggs made a number of recommendations. In order to broaden the course offerings at the high school level and to cope with teacher recruitment and retention issues, he recommended the substantial use of technology for program delivery in small schools, especially in small high schools. His specific recommendations were:

- 3.4-That by direct classroom teaching or by distance education, all senior high schools should have the ability to offer all courses which are prerequisite to entry into post-secondary institutions and the ability to accommodate particular course requirements of small numbers of students (p.26).
- 3.5-That measures be taken to ensure that a course in high school chemistry level 2 (Grade 12) and a course in high school physics level 2 (Grade 12) are available to small high schools by September 1987. Consideration should be given to delivery by computers, audio-video tapes or by other means of distance education (p. 27).
- 3.6-That greater use of technology be made in program delivery in small schools; especially in small high schools (p.28).



- 3.7-That a Distance Education School be established and a principal and teachers be employed to assume responsibility for the development and administration of distance education courses (p.28).

These recommendations initiated the development of distance education in the province.

### **Telemedicine and Educational Technology Resources Agency (TETRA)**

Consequently, in response to the Riggs' report, the Department of Education planned to develop a “Distance Learning Model” for remote schools (Boone, 2008). Two officials at the Department of Education, Doug Young and Wilbert Boone, were assigned to investigate a distance learning model for the province. They gathered information from other Canadian provinces where distance learning was employed. They also visited the Telemedicine and Educational Technology Resources Agency (TETRA) at the Health Sciences Complex in St. John's. They recommended the use of TETRA to deliver senior high school courses to small rural schools. TETRA had been established in 1977, and was used for research development programs and service delivery in the fields of Education and Health in Newfoundland and Labrador. At TETRA, an audio graphics system was used to conduct teleconferences (Barbour, 2007). It was decided to use the TETRA network to deliver courses to senior high school students in small rural communities (Johnson, 2011).

According to Boone (2008), Advanced Mathematics 1201 was designed and launched as a pilot distance education project in 1988. In the first cohort, 36 students from 13 small schools across Newfoundland and Labrador studied Advanced

Mathematics 1201. Boone further reported that the delivery of courses through TETRA to rural students was the first step towards e-learning in the province. In order to meet the increasing demands of distance education, eight regional networks were created by TETRA. In addition to the regional networks, there were also three networks for schools. These school district networks were established for schools by TETRA at the request of the school districts themselves.

The main purpose of the Small Rural Schools Distance Learning Project was to provide opportunities for rural students to enrol in courses like Math and Science, which were prerequisites for enrolling in post-secondary institutions but were not available in small schools. However, many issues such as (a) high cost, (b) scheduling, and (c) administrative constraints had significant impact on the ability to deliver courses through distance education to senior high school students in small rural schools.

### **Centre for Distance Learning and Innovation (CDLI)**

In 1999, the Government of Newfoundland and Labrador appointed a Ministerial Panel on educational delivery in the classroom. The results of the panel's inquiries were published in the document *Supporting Learning* (2000). The Sparkes-Williams Ministerial Panel recommended that the Department of Education establish a Centre for Distance Learning and Innovation in the province. It also recommended that the Department of Education greatly increase the courses offered through distance and adopt an online mode of delivery. As a result, in December 2000, the Centre for Distance Learning and Innovation (CDLI) was established by the Department of Education. The

main purpose of CDLI was to advance learning opportunities and career options for students, especially in rural areas. Today, CDLI delivers online courses to senior high school students throughout the province. Their vision is outlined on the CDLI website:

1. Provide access to educational opportunities for students, teachers, and other adult learners in both rural and urban communities in a manner that renders distance transparent.
2. Eliminate geographical and demographical barriers as obstacles to broad, quality educational programs and services.
3. Develop a culture of e-learning in our schools which is considered to be an integral part of school life for all teachers and students.

CDLI's primary target students are students who attend schools in small and remote communities (Boone, 2008). In its first year CDLI offered 10 courses in Academic Mathematics, Advanced Mathematics, Physics, Chemistry, Technology Education, and French to 200 senior high school students from 76 schools (Barbour, 2007). Currently, CDLI offers more than 42 courses in Art, Career Education, English Language, French, Mathematics, Advanced Mathematics, Science, Music, Social Studies, Technology Education, and Skilled Trades.

### **Purpose of the Research**

This qualitative research project used a case study methodology (Flyvbjerg, 2006; Macpherson, Brooker, & Ainsworth, 2000; Merriam, 1988; Stake, 2010) to describe the

genesis and evolution of the online distance program provided by the Centre for Distance Learning and Innovation. CDLI has been in existence for 18 years. Despite its significant role in rural education in Newfoundland and Labrador, little research has been done on CDLI. While there has been research on particular aspects of CDLI (Barbour, 2007; Boone, 2008; Crocker, 2007; Johnson, 2011; Mulcahy, 2007; Stevens, 2006; Stevens, 2008), there has not been any systematic and comprehensive research. As a result, little is known about (a) the structure and organization, (b) the pedagogy employed, or (c) the challenges that have been encountered and resolved. Frequent calls for higher quality research and for more studies on K-12 online programs persist (Barbour & Mulcahy, 2009; Barbour & Mulcahy, 2013).

### **Research Questions**

The central question I have explored in this study is how CDLI has attempted to equalize educational opportunity for rural high school students in Newfoundland and Labrador. The following additional research questions were investigated:

1. How and why did CDLI come into being?
2. How has the CDLI program developed and evolved?
3. How does learning and teaching occur in the CDLI online learning environment?
4. What challenges have been overcome and what ones remained to be conquered?

### **Methodology**

The methodological framework for this study is qualitative and interpretive. The search is for the interpretation of meanings in social contexts and the chosen strategy of investigation is the case study. The case study design deliberately covers contextual

situations, focuses on process and understanding, and offers insights and illuminates meanings (Merriam, 1998; Yin, 2003). Stake (2000) describes three types of case studies: (a) intrinsic case study, (b) instrumental case study, and (c) multiple case study. I engaged in an in-depth study of the CDLI through an intrinsic case study design method to better understand the case. In an intrinsic case study, a researcher wants better understanding of the case (Stake, 2000). The data in this study were obtained through interviews and document analysis. Seidman (2006) argues that in qualitative research the participants are active subjects. Their viewpoints open doors for researchers to have access to their lives. The main purpose of an interview is to capture the experiences of other people and to understand them through their frame of reference. The participants in the study—present and former employees of CDLI—were purposefully selected in order to gain a better understanding of the case.

### **Significance of the Study**

CDLI is the only organization providing K-12 online distance education in the province of Newfoundland and Labrador. This study is significant for a variety of reasons. Research has been done on CDLI, but this is the first comprehensive research study. This study is a thorough depiction of CDLI and its contribution to education in rural schools. This study provides a clear picture of the implementation of online distance education in the province. This is also a comprehensive research study on a province-wide system. In addition, the study identifies the unique aspects of CDLI in comparison to other systems in other places, including its provincial responsiveness. Merriam (2001) states that gained knowledge from case studies can influence policy makers. The results

should also be of interest to (a) educators, (b) policy makers, (c) school districts, (d) educators, (e) e-learners, and (f) parents of e-learners. The unique nature of CDLI makes it a world leader in terms of providing education in a large sparsely populated area; meeting the needs of diverse learners—especially rural students—using both synchronous and asynchronous modes of teaching; and delivering education. While the scope of the analysis is limited to the province of Newfoundland and Labrador, the findings have wider national and international relevance, particularly for countries that are interested in virtual schooling at the K-12 level. The findings may guide the policy makers and educators who are in the early stages of developing virtual schooling in Canada or elsewhere in the world. This study raises new questions about online education in rural areas. The outcomes of the study pave the way for CDLI to become more effective and accessible in order to meet the needs of 21<sup>st</sup>-century learners. The results also support the sustainability of our rural communities.

### **Delimitations and Limitations**

This study has been delimited to the historical development of the Center for Distance Learning and Innovation since it is the only virtual school in the province. The study has been further delimited to the responses of former and present employees and E-teachers of CDLI who participated in this study. One of the limitations of this study is its inability to objectively measure all the factors of K-12 online education in Newfoundland and Labrador. Another limitation is that the participants who participated in this study may not be a complete representation of the total population.

### **Organization of the Dissertation**

This dissertation is organised into five chapters. This chapter has introduced the study's context, approach, purpose, significance, assumptions; delimitations; and limitations. The research questions were also identified. The outline for the remainder of the study is as follows:

- Chapter Two-Literature Review: A review of the literature related to the areas of study, specifically high school online distance learning.
- Chapter Three-Research Methodology: A description of the research methods used in this study.
- Chapter Four-Findings and Interpretations: A presentation of the findings of this study.
- Chapter Five-Conclusion: An overview of the study, with summary, discussions, and recommendations.

## **Chapter Two**

### **Literature Review**

The purpose of this study is to describe the genesis and evolution of the K-12 online distance program provided by the Centre for Distance Learning and Innovation (CDLI) in the province of Newfoundland and Labrador. Specifically, I sought to understand how CDLI has attempted to equalize educational opportunities for rural high school students in the province. This study was accomplished by examining the experiences of CDLI employees and E-teachers. To carry out this research study, it was necessary to review the current literature in the field of K-12 online learning in order to guide my interpretation of the results.

The purpose of this chapter is to review the scholarly literature related to the emerging field of K-12 online learning. In this chapter, I will focus on the following seven questions:

1. What is K-12 online learning?
2. How has K-12 online learning grown?
3. What is the rationale for K-12 online learning?
4. How is technology employed for teaching and learning in a K-12 online learning environment?
5. What is the role of an E-teacher?
6. What challenges do online learners encounter?
7. What factors are necessary for students to succeed in K-12 online learning?

This literature review includes refereed papers, reports, and books published on K-12 online learning. Since K-12 online learning is a new field, published literature is limited.



To locate the relevant literature, I used Google Scholar and Memorial University Libraries (on-campus and online). Social networking websites for academics such as Academia and ResearchGate were also utilized to find relevant literature on K-12 online learning. I also consulted colleagues in the field.

As I began to review the literature, it became clear that print-based courses, broadcast courses, and tele-learning were the most common types of K-12 distance education before the emergence of K-12 online learning. All of these earlier types had very limited teacher-student interaction. K-12 online learning, however, contains features that provide opportunities for interaction and communication among its users (Rice, 2012). I also discovered that K-12 online learning had been growing exponentially since its emergence in the 1990s in the United States (Davis, Roblyer, Charania, Ferdig, Harms, Compton, & Cho, 2007; DiPietro, Ferdig, Black, & Preston, 2008; Smith, Clark, & Blomeyer, 2005). Researchers in the field tend to agree that it has the potential to attract a variety of learners by providing them ample educational opportunities, such as access to a wide range of courses and programs, flexibility, and credit recovery (de la Varre, Keane, & Irvin, 2010). K-12 online learning has opened new vistas of distance learning, with the opportunity for increased teacher-student interaction at its forefront.

### **Defining K-12 Online Learning**

In the literature a number of terms are often used interchangeably with K-12 online learning. These include virtual schooling, virtual learning, e-learning, cyber learning, online distance education, electronic learning, and web-based learning (Carnevale, 2001; Saba, 2005). It will be understood that throughout this chapter, for whichever of these terms is being referenced, the meanings of the terms are consistent

unless otherwise indicated. Thus, all of the terms above refer to the delivery of education in which computer technology and the Internet are used to deliver instruction and to facilitate communication among participants (Rice, 2012). With online learning, the learners and teachers are physically separated, but they connect with each other through interactive telecommunications systems (Schlosser & Simonson, 2002).

The International Association for K-12 Online Learning (iNACOL) (2011) project defined distance learning as a “general term for any type of educational activity in which the participants are at a distance from each other—in other words, are separated in space. They may or may not be separated in time i.e. asynchronous vs. synchronous” (p. 5). Online learning is a modern form of distance education. Various definitions of online learning have been presented by researchers such as Barbour and Reeves (2009), who defined virtual schools as “an entity approved by a state or governing body that offers courses through distance deliver—most commonly using the Internet” (p. 402). Researchers in the field agree that virtual schooling or K-12 online learning is a form of distance education in which teacher and learners are separated in time or space, and occur through an organization, which offers formal instruction via the Internet (Clark, 2001; Rice, 2009; Smith, Clark, & Blomeyer, 2005; Watson, Winograd, & Kalmon, 2004). The most comprehensive definition of online learning was presented by Watson, Murin, Vashaw, Gemin, and Rapp (2013):

Online learning is teacher-led education that takes place over the Internet, with the teacher and student separated geographically, using a web-based educational delivery system that includes software to provide a structured learning environment. It may be synchronous (communication in which participants

interact in real time, such as online video) or asynchronous (communication separated by time, such as email or online discussion forums). It may be accessed from multiple settings (in school and/or out of school buildings). (p. 8)

In that case, it is clear that the learner and the teacher are physically in separate places. However, learning also takes place via the Internet and computer technology.

### **Types of K-12 Online Learning**

Experts in the field of K-12 online learning have defined a range of different types of K-12 online learning. Clark (2001) defined a virtual school as “an educational organization that offers K-12 courses through Internet or Web-based methods” (p. 8). Similarly, iNACOL (2011) defined a virtual school as “a formally constituted organization (public, private, state, charter, etc.) that offers full-time education delivered primarily over the Internet” (p. 7). Watson, Murin, Vashaw, Gemin, and Rapp (2013) stated that virtual schools offered all their courses through online delivery mode. The example of cyber schools provided was Connections Academy, and the examples of virtual schools provided were Florida Virtual High School and Center for Distance Learning and Innovation (CDLI). In the same report, Watson et al. (2013) used the following definitions:

**Supplemental online programs** provide a small number of courses to students who are enrolled in a school separate from the online program. Some states refer to these as part-time programs.

**Fully online schools**, also called cyber schools, work with students who are enrolled primarily (often only) in the online school. Cyber schools typically are responsible for ensuring their students take state assessments, and are

responsible for their students' scores on those assessments. Many fully online schools are charter schools, although there are a growing number of fully online district schools.

For **blended learning**, we use the Christensen Institute definition: "The Institute defines blended learning as a formal education program in which a student learns at least in part through online learning, with some element of student control over time, place, path, and/or pace; at least in part in a supervised brick-and-mortar location away from home; and the modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience." We define blended schools as stand-alone schools with a school code (as opposed to programs within a school) that deliver much of their curriculum in a blended format and students are required to show up at a physical site for more than just state assessments. (pp. 7-8)

Horn and Staker (2011) define blended learning as "any time a student learns at least in part at a supervised brick-and-mortar location away from home and at least in part through online delivery with some element of student control over time, place, path, and/or pace" (p. 3). Blended learning supports student learning by providing students opportunities to repeat their lessons, and work at their own space and pace (Roblyer, Freeman, Stabler, & Schneidmiller, 2007).

### **The Growth and Development of K-12 Distance Learning**

Distance education is not a new phenomenon (Adelstein & Barbour, 2017). It can be traced back to the introduction of correspondence courses (Barbour, 2014). Distance education evolved through various stages. Moore and Kearsley (2005) described the five

stages of distance education: (a) correspondence, (b) broadcast radio & television, (c) open universities, (d) teleconferencing, and (e) the Internet. In the United States, Clark (2013) described similar trends. He reported that the use of (a) correspondence courses, (b) audio distance education, (c) instructional television, and (d) the use of computers were the main stages in the evolution of distance education. According to Clark and Barbour (2015), online distance education at the K-12 level became feasible on a large scale in the 1990s. They further explained that a wide range of technologies set the stage for online learning at the K-12 level. The growth of K-12 online learning has increased rapidly, and continues to increase (de la Varre, Keane, & Irvin, 2011; DiPietro, Ferdig, Black, & Preston, 2008; Smith, Clark, & Blomeyer, 2005).

Barbour (2012) outlined the history of K-12 online learning. Online courses at the K-12 level were offered for the first time in the United States by Laurel Springs School in California in 1991. Barbour (2013a) reported that Florida Virtual School (FLVS), the first entirely online supplemental virtual school, was established in 1997. Its purpose was to offer advanced placement courses to students regardless of their location (Friend & Johnston, 2005). Similarly, the University of Nebraska and the Virtual High School Consortium started offering online high school courses during the academic year 1996-1997 (Clark & Barbour, 2015; Kozma, Zucker, & Espinoza, 1998; Smith & Northrup, 1998).

Since the 1990s, enrolment in virtual schools and online courses has been growing (Allen & Seaman, 2010; Barbour & Reeves, 2009; Weiner, 2003). The growth of e-learning has occurred at all levels of K-12 schooling (Irvin, Hannum, Varre, & Farmer, 2010). A major portion of the K-12 online education increase has occurred in the United

States. In the 2001-2002 school year, Clark (2001) reported that 45,000 students were registered in at least one course. Setzer and Lewis (2005) reported that during the 2002-2003 school year in the United States, almost one third of public school districts had students registered in online distance courses. In 2005-2006, the student enrolment in online courses reached 700,000 (Tucker, 2007). Rice (2012) also reported an increase in K-12 online distance education in the United States. She noted that in the United States the annual growth of virtual schooling was 30%. The enrolment in online courses reached 4,000,000 in 2011, an increase from 50,000 in 2000. She also reported that 45 out of 50 states had their own virtual schools. Watson, Murin, Vashaw, Gemin, and Rapp (2011) reported that all 50 states had some form of K-12 online learning in place.

Online learning has also been growing in Canada. K-12 online learning began in British Columbia in 1993 (Barbour, 2013a). According to Barbour (2013b), there were almost 25,000 K-12 students enrolled in online distance courses in 1999-2000 in Canada, while the number of enrolments reached 284,963 in 2011-2012. Barbour also reported that there were more than 250 virtual schools that offered K-12 online distance education in Canada. Barbour and LaBonte (2016) reported that some provinces, such as Newfoundland and Labrador, had one virtual school, i.e. the Centre for Distance Learning and Innovation (CDLI). Other provinces such as Ontario, British Columbia, Manitoba, and Alberta had more than one K-12 online learning program depending on the students' enrolment and need for distance courses. Barbour (2013b) reported that in each and every province and territory students registered for online courses. He stated that British Columbia and Alberta had the highest numbers of K-12 online learners. In 2015, Barbour and LaBonte submitted their report *State of the Nation: K-12 E-Learning in Canada*,

which clearly stated that the number of students in Canada enrolled in K-12 distance education had reached almost 317,148 during the 2014-2015 school year.

Barbour and LaBonte (2016) went on to present a current snapshot of K-12 e-learning in Canada. In their 2016 report, *State of the Nation: K-12 E-Learning in Canada*, they reported that “Canada continues to have one of the highest per capita student enrollment in online courses and programs of any jurisdiction in the world” (p. 1). They concluded that K-12 students from all 10 provinces and three territories were engaged in some form of e-learning. They further clarified that except for Prince Edward Island and Nunavut all provinces and territories had their own individual distance learning programs. The researchers identified the total enrolment in all jurisdictions in Canada in K-12 online distance education as approximately 293,401 during the 2015-2016 school year. They also revealed that in addition to the provincial and territorial e-learning programs, three e-learning programs were designated for aboriginal students.

Internationally, K-12 online learning is expanding in developed and developing countries. As well as the United States and Canada, many jurisdictions in the United Kingdom, Australia, and New Zealand have their own K-12 online learning programs (Barbour & Reeves, 2009; Compton, Davis, & Mackey, 2009; Zucker & Kozma, 2003). China had 600,000 students enrolled in 200 online schools in 2011 (Clark & Barbour, 2015). Patrick and Powell (2006) drew attention to international trends in K-12 online learning. They reported that Australia, China, Hong Kong, Iran, Kazakhstan, Nepal, New Zealand, Singapore, Turkey, and the United Kingdom had some form of e-learning for their K-12 students.

In Canada and the United States, studies have also been conducted in rural

jurisdictions. For instance, Hannum, Irvin, Banks, and Farmer (2009) carried out research in rural America to investigate the extent to which distance education is being used in rural schools. They studied (a) use of technologies, (b) curriculum areas, (c) need for distance education, (d) level of satisfaction with distance education, and (e) barriers to distance education. The data were collected through telephone surveys from 394 school districts. Their findings indicated that a major portion of rural schools were using distance education. Mathematics, foreign languages, and English subjects were most often offered through distance education. Most school districts showed satisfaction with distance education. Some even wished there were more courses offered through distance education.

The rapid growth in virtual schooling can be attributed to a number of factors, including:

- an increase in access to the Internet and internet technologies;
- a decrease in the price of hardware;
- a growing variety of learners with different educational needs;
- the appeal of cost effective distance education; and
- societal changes (Barbour, Archambault, & DiPietro, 2013; Davis & Roblyer, 2005; Johnson, 2011).

While there is variety in the types of learners, there is also variety in the reasons learners take online courses; reasons including (a) flexibility in scheduling, (b) disabilities, (c) disciplinary problems, (d) home schooling, and (e) limited curriculum at their own schools, especially in rural schools (Rice, 2006; Roblyer, 2005).



## **Research on K-12 Online Learning**

Almost two decades have passed since the inception of K-12 online learning. Barbour (2013a) reported that although K-12 online learning had been growing exponentially, published research in K-12 online learning had not kept pace. Barbour (2011) reviewed 262 articles published from 2005 to 2009 in notable distance education journals in Australia, New Zealand, Canada, and the United States. He found that less than 10% of articles were related to K-12 online distance education. Cavanaugh, Barbour, and Clark (2009) stated that the published literature on K-12 online distance education was mainly based on the opinions and experiences of those who were involved with K-12 online learning. Most of the research studies in online learning settings also focused on post-secondary education (Harvey, Greer, Basham, & Hu, 2014).

There is an immense need for quality research in many areas of K-12 online learning, such as (a) the impact of synchronous and asynchronous technologies on students' performance, (b) effectiveness of online learning in primary and secondary settings, (c) barriers to online learning at the high school level, (d) students' satisfaction, (e) teaching strategies, (f) characteristics of successful online learners, (g) social interaction opportunities, and (h) learners' experiences in an online learning environment (Barbour & Reeves, 2009; Cavanaugh, Barbour, & Clark, 2009; Irvin, Hannum, Varre, & Farmer, 2010; Rice, 2006).

Barbour (2013) reported that much of the research in K-12 online learning is found in master's theses and doctoral dissertations. He identified various areas in which a scarcity of research exists on K-12 online learning, including (a) examination of student enrolment at virtual schools, (b) enrolment at elementary level, (c) comparison of

students' performance, (d) effectiveness, and (e) issues related to readiness and retention of online learners. Smith, Clark, and Blomeyer (2005) recommended seven different areas for future research:

1. interpreting "equal or better" achievement findings;
2. student persistence;
3. student process skills;
4. student satisfaction and motivation;
5. learner characteristics;
6. the feature of online learning systems; and
7. educational context.

Archambault (2010) recommended (a) teacher education, (b) professional development, and (c) support for teachers as areas for future research. Similarly, Ferdig, Cavanaugh, DiPietro, Black, and Dawson (2009) called for more research in the areas of teaching, content, technology, and the relationship between all three.

### **Rationale for K-12 Online Learning**

Almost all researchers who work with rural schools agree that attracting and retaining certified and qualified teachers is a perennial issue in rural communities (Herzog & Pittman, 1995; Holloway, 2002; Lowe, 2006; Monk 2007). As a result of difficulties in attracting and retaining highly qualified teachers, the provision of a comprehensive curriculum has always been a great challenge in rural schools, and these are common issues in rural communities throughout the world (Mulcahy, 2002). Therefore, online learning has been proposed as an alternative to closure and consolidation and a mode of delivery that could offer a wide range of courses to rural high school students through

highly-qualified teachers (Barbour, 2007; Barbour & Mulcahy, 2006; Burney & Cross, 2006; Hobbs, 2004; Jimerson, 2006). In addition, it is expensive for rural schools to provide specialists for a small number of students (Stevens, 2013). The recent developments in internet technologies have made online learning a viable option for rural schools (Malecki, 2003).

As Davis and Roblyer (2005) stated, “The vision that drove the first virtual schools was that of more affordable, consistent, and equitable access to high-quality educational opportunities for students who need them most: rural, underserved, and at-risk populations” (p. 400). Students in remote communities at the high school level can enroll in online courses that are not offered at their small schools (Barbour, 2010; Barbour & Mulcahy, 2009; Canaugh, 2001; Davis & Roblyer, 2005). In other words, online learning is a valid solution for the problems of teacher supply and retention in rural areas (Hannum et al., 2009).

It has also been claimed by those who work in K-12 e-learning that, in addition to providing for the curriculum needs of rural students, several other groups are also served by virtual schools. They include (a) advocates of school choice, (b) non-traditional learners, (c) learners with medical issues, (d) home schoolers, and (e) those in need of credit recovery (Burgess-Watkins, 2011; Cavanaugh, Gillan, Kromrey, Hess, & Blomeyer, 2004; Rice, 2006). Laing (2010) stated that virtual schools can offer students access to high quality education by overcoming the issues of racism, cultural backgrounds, and sexual orientation. De la Varre et al. (2010) stated that online distance education “is considered a flexible option for non-traditional learners such as adults and home-schooled students, and a convenient

way to deliver remedial courses” (p. 193). Virtual schools can serve all students who for various reasons cannot attend a traditional brick-and mortar-school.

Advocates of online learning also claim that online distance education has the potential to offer individualized instructions to create collaborative skills, highly important in the 21st century (de la Varre, Keane, & Irvin, 2010). Supporters of K-12 online learning claim that it has many potential advantages, including opportunities for learners to work at their own pace (Berge & Clark, 2005). Still, some researchers argue that the expansion of K-12 online learning was due to budget cuts, overcrowded traditional schools, and exploration of alternative modes of delivery (Collins, 2001; Fulton, 2002; Herring, 2004). Advocates argue that K-12 online learning has the potential to enhance students’ learning. As Malnor (2015) states:

Proponents argue that online curriculum can be tailored to individual students and that it has the potential to promote greater student achievement than can be realized in traditional brick-and-mortar schools. Further, lower costs—primarily for instructional personnel and facilities—make virtual schools financially appealing.  
(p. 1)

Abram (2005) describes two main types of benefits for online learners: (a) E-learning provides opportunities to re-teach and practice a piece of learning, and (b) E-learners have easy access to resources like learning materials, websites, and readings that are there for their benefit.

Other potential benefits of online learning include higher levels of student motivation, cost-effective provision of education, and provision of high-quality learning opportunities. These allow for educational choice, administrative efficiency, and

improved student outcomes and skills (Barbour, 2010; Berge & Clark, 2005). Rice (2012) also claimed that e-learning could serve professional athletes, students who were incarcerated, and students who needed flexible schedules for employment. Kellogg and Politoski (2002) included other benefits such as individual teaching for specific needs and learning styles, flexibility in schedule, and opportunities for the students who were unable to attend brick-and mortar schools. Barbour (2013) clearly stated that most of the benefits were potential benefits not yet proven by empirical evidence.

### **Virtual School Management**

In the United States, researchers have classified virtual schools into various categories. Watson, Winograd, and Kalmon (2004) described five types of online programs; namely (a) state-wide supplemental programs, (b) district-level supplemental programs, (c) single-district cyber schools, (d) multi-district cyber schools, and (e) cyber charters. Later, in 2009, Rice (2009) presented a similar classification. She reported that K-12 virtual schools were operated by (a) public school districts, (b) local education agencies, (c) state education agencies, (d) colleges and universities, and (e) non-profit and for-profit agencies.

In Canada, Barbour and LaBonte (2016) reported in their ninth report on the state of the nation that all K-12 online learning programs were operated through provincial and territorial governments. CDLI was operated through the provincial government of Newfoundland and Labrador. The researchers also reported that, in addition to the programs operated by provincial and territorial governments, there were three K-12 online learning programs for aboriginal students in Ontario, Manitoba, and Alberta, one

in each province. They further explained that some private K-12 online learning programs were also administered in the provinces of Ontario and British Columbia, noting that those were operated as businesses.

In terms of cost, Anderson, Augenblick, Decesare, and Conrad (2006) reported that the operational cost of an online school was the same as the operational cost of a traditional school. They noted five main categories of costs for a virtual school: (a) management, (b) instruction, (c) course development, (d) technology set-up, and (e) technology personnel. Furthermore, they stated that most virtual schools, such as Florida and Minnesota, were funded on the basis of pupil enrolment, meaning they operated on a per-pupil based formula. Patrick, Myers, Silverstein, Brown, and Watson (2015) described four categories of funding models for fully online schools:

1. Online schools may be charter schools, and receive funding that is equal to physical charter schools. States in this category include Michigan, Minnesota, Oregon, Utah, and Wisconsin. Funding in these cases is usually between \$6,000 and \$9,000 per student.
2. Online schools may be charter schools that are funded at a lower rate than physical charter schools. Indiana and Ohio, for example, fund online charter schools at about 90% of the brick-and-mortar charter school rates, which are already lower than traditional school district funding levels. South Carolina funds all charters through the South Carolina Public Charter School District; legislation in 2011 that increased base funding for brick-and-mortar charter students to nearly double the funding level of virtual charter student funding.

3. Online schools may be a mix of charter and non-charter schools, and funded at a rate that applies to all online schools. Arizona funds full-time online students at a rate of 95% of the base funding rate of traditional students, while Colorado sets a rate for multi-district online schools that is about 92% of the average rate across districts.
4. Pennsylvania funds students at similar levels regardless of the delivery model, so students generate similar funding for online schools as they do for physical schools. Even so, charter schools are still funded at a lower level than what traditional school districts receive due to several adjustments made in the funding formula districts use to forward funds to charters. (p. 17)

Patrick et al. (2015) further reported that the funding for supplemental online courses was dealt with differently from place to place. They explained that when a student took an online supplemental course with a resident district, the funding for that student would be the same as any other student in that district. The researchers recommended the use of a performance-based funding system for online schools. Regarding students' tuition fees, Clark (2001) indicated that, on average, a student paid \$300 per semester. However, the tuition fee might vary from state to state and from program to program. In Canada, Barbour and LaBonte (2016) reported that most K-12 online learning programs were funded by the provincial and territorial governments, and students did not pay any fees.

### **Technology Usage**

Regarding technology, a wide range of technological tools are used in online learning, including (a) instant messaging, (b) chat tools, (c) telephone, (d) audio

communication, (e) fax, (f) email, (g) threaded discussions, (h) Web 2.0 tools, (i) video conferencing, and (j) a course management system or a Learning Management System (LMS) such as Blackboard Collaborate or Moodle (Barbour & Unger, 2014; Davis & Niederhauser, 2007; Rice, 2006). Abram (2005) also identified three types of LMS commonly used in the K-12 online learning environment: (a) Blackboard, (b) Desire2Learn, and (c) Moodle. Instructions are delivered synchronously, with students and teachers communicating in real time, and asynchronously, with students working at different times, or a combination of both (Rice, 2006).

In an asynchronous mode, to facilitate learning and to enhance teacher and student interaction, tools like (a) email, (b) online discussion forums, (c) blogs, (d) podcasts, and (e) electronic chats are used. In a synchronous mode, tools like (a) video conferencing and (b) audio conferencing are used for communication among learners and teachers. A wide range of tools including (a) LMS, (b) communication tools, (c) writing and reflection tools, (d) collaborative tools, (e) multimedia tools, (f) networking tools, (g) instructional teaching aids, and (h) web conferencing tools can be used for instruction (Rice, 2012).

### **Role of the Online Teacher or E-teacher**

The role of teachers in an online learning environment is as important as it is in a face-to-face classroom. However, the teaching techniques used for traditional classes may not necessarily be useful for online learning environments (Roblyer, Freeman, Stabler, & Schneidmiller, 2007). E-teachers need all the skills and knowledge of traditional teachers; they also need additional qualities and skills (Davis, Roblyer, Charania, Ferdig, Harms, Compton, & Cho, 2007; Hawkins, Graham, & Barbour, 2012; Rice, 2006). Compton et



al. (2009) stated that an E-teacher's role is different from a traditional teacher's role because an E-teacher is supported by administrators and on-site facilitators. In this sense, educational responsibilities are distributed among online learning providers and host school participants (Davis & Niederhauser, 2007).

An E-teacher must perform multiple roles. Goodyear, Salmon, Spector, Steeples, and Tickener (2001) described the role of an E-teacher as a (a) content facilitator, (b) metacognition facilitator, (c) process facilitator, (d) advisor, (e) assessor, (f) technologist, and (g) resource provider. Similarly, McPherson and Nunes (2004) presented the four roles of an E-teacher: (a) pedagogical, (b) social, (c) managerial, and (d) technical. Cyr (1997) described a number of the characteristics of an E-teacher:

- course planning and organization skills that capitalize on distance learning strengths and minimize constraints;
- verbal and non-verbal presentation skills specific to distance learning situations;
- collaborative skills to work with others to produce effective courses;
- ability to use questioning strategies; and
- ability to involve and coordinate student activities among several sites. (p. 17)

In addition to these specific characteristics, pre-service teacher training and professional development are essential factors to perform the responsibilities of an E-teacher (Goold, Coldwell, & Craig, 2010).

E-teaching becomes problematic and unsuccessful when untrained teachers are appointed to teach. Cosetti (2000) found that E-teachers needed specific training to deal with online learners because e-teaching was not possible with conventional teacher

training only. According to Rice (2006), even highly motivated students may feel isolated and discouraged in an online learning environment. Weiner (2003) concluded that “The research findings confirmed that a high degree of student-teacher interaction, including feedback and summaries to the students are a necessity in the virtual classroom, otherwise students felt ignored, lonely and lost in their courses” (p. 49). Due to an increase in K-12 online learning, researchers have consistently called for pre-service E-teacher training (Davis & Roblyer, 2005; Irvine, Mappin, & Code, 2003). Likewise, Stevens (2008) insisted that professional development educational programs prepare teachers for virtual teaching.

One of the most critical issues in online teaching remains time management. Archambault (2010) stated that E-teachers enjoy the flexibility of time but, concurrently, spend more time and energy with online teaching than teachers in traditional schools. Some of the challenges she identified in virtual teaching included course content development and dealing with students' issues. Concluding her article, Archambault highlighted the need for more professional development and pre-service teacher training. Compton et al. (2009) also described challenges faced by pre-service teacher training programs, such as how to provide guided observations, how to provide effective practical mentoring skills, and how to provide examples of effective online teaching to pre-service teachers.

In order to take on multiple roles successfully and cope with the needs of online learners, a teacher must acquire specific training. Salmon (2003) suggested that E-teachers should help learners in all learning activities, including complex ones, to build a successful online learning environment. Ferdig, Cavanaugh, DiPietro, Black, and Dawson

(2009) suggested that an E-teacher's choice of pedagogy, content, and technology could play a major part in students' online learning experience. An online teacher should have verbal and non-verbal presentation skills, the ability to use questioning strategies, and the ability to involve and coordinate student activities (Cyr, 1997). E-teachers should use suitable strategies to engage online learners in order to develop a sense of community online (Barbour & Hill, 2011). Weller (2005) recommended that online teachers should utilize the Internet to employ interactive activities. Furthermore, they should be ready to experiment and change. In order to give students the opportunity to communicate, to provide prompt feedback, and to collaborate with their peers, E-teachers should know how to use a wide range of technology effectively (Davis & Niederhauser, 2007). Stevens (2007) described an E-tutor's role as a creator of online discussion forums. Davis et al. (2007) stated that with the growth of e-learning, the demand of E-teachers, on-site facilitators, and designers was increasing. From the research it is evident that there is a need for teacher education programs that cope with the challenges of online teaching.

### **K-12 Online Learning Challenges**

Virtual learning has been growing rapidly in the United States and in Canada (Barbour & LaBonte, 2015; Rice 2012). However, available literature suggests that K-12 online learning faces many challenges. One of the impediments to the growth of virtual schooling in some jurisdictions is infrastructure and technical issues. Unlike traditional schools, K-12 online schools face issues such as lack of funding, technical issues, and untrained personnel (Rice, 2006). The most common obstacles to distance education are related to teaching in the e-learning environment.

Berge and Mrozowski (1999) noted that concerns over cultural and pedagogical change, as well as a lack of support for teachers, were challenges to e-learning. Other barriers include the difficulty of implementing distance courses and limited connectivity (Hannum, Irvin, Banks, & Farmer, 2009; Irvin et al., 2010). According to Irvin et al. (2010), connectivity was a major barrier to online distance education because it could limit the delivery of internet-based courses. Another impediment to virtual schooling is cost-related. Berge and Clark (2005) described challenges to virtual schooling such as (a) high start-up costs, (b) access issues surrounding the digital divide, (c) approval or accreditation of virtual schools, and (d) student readiness and retention.

In relation to the difficulty posed by K-12 online learning in rural jurisdictions, Irvin, Hannum, de la Varre, and Farmer (2010) conducted a research study to investigate barriers to distance education in small and low-income rural schools. Data were collected through telephone surveys with administrators and other qualified personnel from 417 randomly selected small schools in rural communities. The findings were categorized in sections:

1. District barriers. Many officials reported three main impediments: (a) distance education not being necessary to fulfill curriculum requirements, (b) insufficient funding, and (c) lack of priority in the district.
2. Labour barriers, specifically, not having trained personnel to host distance education.
3. Technology barriers: (a) lack of technology, (b) maintenance issues, and (c) connectivity issues.

In another study, Hannum, Irvin, Banks, and Farmer (2009) found (a) funding, (b)

scheduling, and (c) difficulty in implementing courses as the common barriers to K-12 online learning. Their findings indicated that connectivity was not a major barrier in many school districts.

### **Student Support**

Barbour and Mulcahy (2004) stated that e-learning might not be suitable for all learners and some would find the independence and self-direction required difficult. For that reason, many learners require school-based support to be successful in an online learning environment (de la Varre et al., 2011). Barbour and Mulcahy (2004) stated that in some learning environments, students needed and received significant support from on-site personnel. In rural schools, the on-site facilitator is directly available to students and physically present at school (Irvin et al., 2009). Facilitators contribute a lot to the success of online learning (Barbour & Mulcahy, 2009). A facilitator performs multiple roles as a supervisor, (b) an assistant, (c) a technician, and (d) a communicator (Barbour & Mulcahy, 2004).

De la Varre et al. (2011) state that successful facilitators need to know their students very well so that they can motivate and assist learners according to the learners' needs. In their study, the authors found that facilitators' immediate feedback and support motivated and engaged struggling online learners. Furthermore, Hughes, McLeod, Brown, Maeda, and Choi (2005) found that students in online courses perceived more teacher support than students in conventional classrooms. In terms of supplemental programs, Davis and Niederhauser (2007) explained that an on-site facilitator (a) advised students on course selection, (b) helped students stay on task, (c) collaborated with parents or guardians, and (d) served as an advocate for students. They also noted that the

instructional technology coordinator played a critical role in making sure that hardware and software were working properly for students and E-teachers alike.

Regarding on-site facilitators, training can play a key role in online learning environments. In most cases, facilitators are untrained and underpaid (Davis & Niederhauser, 2007). Some facilitators are even teachers in the schools. These teachers perform online learning responsibilities on top of their usual workload (Barbour & Mulcahy, 2009). Well-trained and active facilitators not only engage students, but also help decrease the dropout rate. Irvin et al. (2009) found that the Facilitator Preparation Program (FPP) enhanced students' retention and completion of online courses.

Good learning environments have smaller dropout rates (Roblyer & Davis, 2008). An effective online learning environment is a student-centered environment (Palloff & Pratt, 2007). Creating an effective online learning environment is one of the most precarious aspects of successful distance education (Roblyer, 2006). According to Rice (2006), even highly motivated and self-directed students feel isolation and discouragement if they are not provided environmental support in an online learning environment.

Davis and Niederhauser (2007) stated that E-teachers, designers, and on-site facilitators were key players in online learning environments. They further explained that these key players were supported by (a) principals, (b) school counselors, (c) instructional technology coordinators, and (d) students' parents. According to Lee and Figueroe (2012), children performed better if they were supported by their parents. Cowan (2009) also supported the idea that parents should devote time and energy to assist their children to succeed in an online learning environment. The number of schools and classrooms using

technology in general and distance learning in particular is growing (Kargozari & Ghaemi, 2006). According to Huang, Dedegikas, and Walls (2011), multimedia technology combined with appropriate instructional design can create a good learning environment that leads to effective learning. De la Varre et al. (2011) suggested that an E-teacher and a facilitator should decide on a mutual strategy to develop an online learning environment. In addition, administrators could help improve the online learning environment by providing extra support in their schools (Davis & Niederhauser, 2007).

Regarding the establishment of a successful online school, Roblyer (2006) also presented examples of some successful virtual schools:

- Successful online schools provided checklists, self- tests, and a non-credit orientation program so that students could know what to expect from about online learning.
- Successful schools prepared teachers for success. Teachers received substantial training and professional development.
- Successful schools also used interactive and flexible course designs. Student-to-student interaction was given special attention in course design.
- Teachers were supported in successful schools. They were also monitored closely to check that they were following the course standards.
- Students were monitored and supported in successful schools.

### **Appropriateness of K-12 Online Learning for All Learners**

Although K-12 online learning is a fast growing phenomenon in the United States and Canada, researchers in the field tend to agree that students do not all perform equally

in online learning programs (Roblyer, 2006). Some also argue that it may not be appropriate for all learners (Barbour & Mulcahy, 2008). Being a relatively new form of schooling, online learning demands a specific skill set for both learners and teachers.

### **Necessary Attributes for Successful Online Learning**

Success in online courses is not guaranteed for all learners (Lee & Figueroe, 2012). Adolescents need a specific set of attributes and skills to be successful in an online learning environment. In order to be successful in online learning, students need to be (a) highly motivated, (b) self-directed, (c) self-disciplined, (d) independent, and (e) conversant with technology (Haughey & Muirhead, 1999). Roblyer (2005) reported that psychological and technical factors make a successful online learner, detailing them as:

- **Access to and expertise with computers-**To take advantage of virtual school courses, students usually find it helpful to have a computer at home and often possess better-than-average computer skills. However, studies have shown that less affluent students are not as likely to have computers at home. As a result, more affluent students are showing up in greater numbers in virtual school enrolments. Also, Roblyer and Marshall (2002-2003) found that nearly 70% of virtual school students in their sample were Caucasian. This could be due to the high correlation between race and economic level. Schools sometimes address the problem of at-home computer access by providing teacher-monitored time during the school day for students to use computer labs for completing virtual course assignments.



- **Organization and self-regulation**-Successful online students are able to organize their time and regulate their own learning in the relatively unstructured environments of online courses. Although virtual teachers frequently build in checks and prompts to remind and encourage students to keep up with course tasks, students who do best are already so organized and motivated that they need fewer or no prompts.
- **Beliefs about achievement**-Studies indicate that students who do best online have a strong need to achieve and have confidence in their ability to tackle new topics and use new strategies. Online courses represent new and unfamiliar territory, but successful students are not intimidated by this novel setting.
- **Responsibility**-Successful online students seem to be those who realize that their success lies in their own hands. They also know that the source of failure is usually not the teacher, course organization, or other factors. They accept responsibility for finding ways to be successful. When they do less well than they had hoped, they seek out information to improve their performance. This ability relates to a quality sometimes referred to in the educational psychology literature as having “internal locus of control.”
- **Risk-taking**-Communication in virtual environments is primarily written, and assigned tasks may have varying degrees of clarity. Students have to be willing to proceed in the midst of ambiguity and be prepared to do “course corrections” as needed. (p. 2)

Rice (2006) reviewed the available literature on online distance education and found that factors like greater learning autonomy and student responsibility might improve student success in post-secondary online distance education. However, she also indicated that K-12 online learners may not share the same characteristics as adult learners. Lee and Figueroa (2012) added that student's motivation and management skills, parent involvement, and teachers' expectations were significant factors for the success of an e-learner in an online learning environment. After reviewing the necessary attributes of online learners, the following areas make the K-12 online learning picture clearer:

### **Achievement**

Barbour, Archambault, and DiPietro (2013) indicated that comparing students' achievements between online schools and traditional schools was the common research theme in K-12 online distance education. Mulcahy and Barbour (2008) raised the point that there had been concern among some parents that online learning at the high school level was not as good as traditional schooling or was suitable only for highly self-motivated learners. However, studies indicate that students enrolled in online learning environments perform similarly to those in brick-and-mortar schools (Barbour & Mulcahy, 2006; Cavanaugh et al., 2004; McLeod, Hughes, Brown, Choi, & Maeda 2005; Seifert, Sheppard, & Vaughan, 2009).

A number of researchers have verified that studies proving the effectiveness of online learning as similar to face-to-face learning have various methodological issues regarding the selective nature of online samples (Barbour, 2013a; Cuban, 2013). Researchers such as Barbour and Cuban, for instance, believe that the actual effectiveness is different than what is presented. Barbour (2013a) further noted that in a study with

Mulcahy (2010), weaker students opted out of basic courses to avoid online courses.

Cuban (2013) also asserted that the literature clearly describes the characteristics of a successful online learner as motivated, self-directed, and self-disciplined. Both Cuban and Barbour raised the point that in such situations, the representation of online learners is not the actual representation of all learners.

According to Rice (2006), the success and failure of online learners is the same as those in conventional schools. She stated that their success depended on who was teaching, who was learning, and how the task of learning was accomplished. Hannum et al. (2009) argued that pedagogy was more important than technology. Researchers in the field tend to agree that technology itself does not improve student achievement; but it has the potential to impact students learning if applied properly with the pedagogy (Clarke, 1983; Kozma, 1991).

### **Retention Rates**

One significant issue in virtual schooling is the high dropout rate (Roblyer, 2005; Roblyer, Davis, Mills, Marshall, & Pape, 2008). Compared to brick-and-mortar schools, virtual high schools have a higher dropout and failure rate, in some cases as high as 60% (Roblyer, 2005; de la Varre et al., 2010). One reason for this is that online courses may not be appropriate for all learners (Mulcahy, 2002). Students either lack the necessary attributes to succeed, or they lack sufficient school-based support, or both.

Rice (2006) reviewed the literature on online learning and found that interactions among students and student-to-teacher interaction were important factors in student retention. She explained that students had a genuine need to make connections with their classmates and with their instructors. She also stated that students with positive relations

with their teachers were less likely to dropout. She pointed out that “Unfortunately, there is very little research examining the relationship between K-12 interaction that directly relates to student performance, satisfaction, and retention in a distance education context” (p. 439). While writing about e-teaching, Stevens (2008) felt the need to enhance interaction between peers and E-tutors. Roblyer and Davis (2008) claimed that learning environments with substantial opportunities for communication and interaction could decrease dropout rates. Varasidas and Zembylas (2003) presented evidence for the importance of student-teacher interaction to decrease attrition rate. In their qualitative study, Barbour and Hill (2011) found that students and teachers were most productive in synchronous classes. They went on to say that during the synchronous classes students were taught similarly to face-to-face classes. Their finding also indicated that the students did not utilize the assigned time for asynchronous classes.

In order to address the retention issue, researchers have suggested a number of strategies. Ronsisvalle and Watkins (2005), for instance, proposed three main points:

1. students' independent choice in course selection;
2. students' previous experience in online learning; and
3. students' assessment prior to enrolment.

Lee and Figueroe (2012) stated that prior assessment helped teachers to determine (a) learners' learning styles, (b) computer skills, (c) self-management, (d) locus of control, and (e) other skills that would help them to succeed in an online learning environment.

Some K-12 online schools have addressed the issue of dropout levels by setting a criterion for the selection and admission of online learners, while others have increased support (Roblyer & Davis, 2008). In small schools in rural and remote places these

solutions may not be possible. As Barbour (2011) described, K-12 online learning in North America was delivered through supplemental programs and full-time programs. He further explained that supplemental programs were those where students attended their traditional schools and the schools allowed their students to register for one or more online courses. In terms of online learners who attended traditional schools, Barbour and Mulcahy (2004) stated, “It was widely known, but rarely documented, that students often required and received a significant amount of assistance with matters of content from school based personnel” (p. 14). Therefore, students who attend traditional schools may seek frequent help from their on-site teachers.

### **Motivating Online Learners**

Motivating online learners is another serious issue. Motivation is very important for a student’s success in a learning environment (Choi & Johnson, 2005). Choi and Johnson underlined four factors that promote motivation: (a) attention, (b) relevance, (c) confidence, and (d) satisfaction. Research shows that (a) convenience, (b) flexibility in scheduling, (c) credit recovery, (d) accelerated learning opportunities, (e) student attributes, and (f) choice of course delivery methods influence motivation (Mills, 2003; Roblyer, 1999; Tunison & Noonan, 2001). Weiner (2003) states that (a) technological support, (b) teacher support, and (c) interaction among peers influence students’ motivation. Researchers in the field agree that students should be encouraged and supported in order to maintain or increase motivation, (Lee & Figueroa, 2012; Murphy & Roderiguez-Manzanares, 2009). Likewise, if students have insufficient support in an online learning environment, they are most likely less motivated (Roblyer, 2006).

### **Chapter Summary**

The main intent of this chapter was to present an overview of the literature on K-12 online learning; a new form of schooling (Davis & Roblyer, 2005). Therefore, various terms have been used to describe K-12 online learning such as virtual schooling, e-learning, online learning, cyber learning, and electronic learning. Basically, with online learning, teachers and students are physically separated. The task of teaching and learning is accomplished through the Internet and computer technology.

Since its inception, many jurisdictions around the globe have been using this new form of teaching and learning. Countries including Canada, the United States, Australia, New Zealand, the United Kingdom, and China have all been using K-12 online learning. Of course, the growth of K-12 online learning is not the same as the growth of online learning at the post-secondary level. However, advocates of K-12 online learning claim that it is the fastest growing phenomenon in the United States and Canada.

Regarding K-12 online learning program governance, these programs are not operated by a single entity. Instead, there are various entities that control and operate these programs. Researchers in the field have classified them into different categories and two types of online learning models have been introduced:

1. Full online learning
2. Blended learning.

One of the initial purposes of K-12 online learning was to provide equitable educational opportunities to all learners, in particular to rural students. The proponents of K-12 online learning claim that this new type of learning has the potential to benefit many learners. To be sure, some challenges hinder virtual schooling. However, most of the

challenges can be overcome with effective online instructions, the support of online learners, and the creation of effective online learning environments.

As a new form of teaching and learning, researchers lament the paucity of research in the field of online learning. They have identified future research areas and called for effective research (Ferdig, Cavanaugh, DiPietro, Black, & Dawson, 2009). Of course, an effective research agenda can also be beneficial in identifying and addressing the aforementioned issues in the field.

## **Chapter Three**

### **Research Design and Methods**

As mentioned above, the purpose of this case study is to describe the genesis and evolution of the online distance program provided by the Centre for Distance Learning and Innovation. Despite the significant role played by CDLI in rural education, little is known about its structure and organization, its effectiveness, and its educational contribution. My main focus is to explore how CDLI has attempted to equalize educational opportunities for rural high school students in the province. This study has addressed the following questions:

1. How and why did CDLI come into being?
2. How has the CDLI program developed and evolved?
3. How does learning and teaching occur in the CDLI online learning environment?
4. What challenges have been overcome and what ones remained to be conquered?

The purpose of this chapter is to outline the study's methods. This chapter includes seven sections, outlined here: (a) research design and methods, (b) ethical considerations, (c) details regarding sampling and participants, (d) data collection, (e) data analysis, (f) trustworthiness, and (g) the researcher positioning.

### **Research Design and Methods**

This qualitative research project used case study methodology to illustrate the work of the Center for Distance Learning and Innovation (CDLI), a virtual school that provides online education to rural and remote high schools in Newfoundland and Labrador. The chosen strategy of investigation was the case study. CDLI is situated in a particular context with clear boundaries. Many scholars attest to the case study as being



an excellent form of research (Guba & Lincoln, 1981; Stake, 1995). It is the most widely used approach in qualitative research in Education (Gall, Gall, & Borg, 2003). Similarly, McMillan and Wergin (2002) describe a case study as “an in-depth analysis of one or more events, settings, programs, social groups, communities, individuals, and other bounded systems” (p. 120). A case study is used to investigate a particular person, group of people, or a teaching context (O’Toole & Beckett, 2010).

A case study is an ideal methodology when the researcher is interested in a holistic and in-depth understanding of the case (Creswell, 2012). The case study design deliberately covers contextual situations, focuses on process and understanding, and offers insights and illuminates meanings (Merriam, 1998; Yin, 2003). In this research study, CDLI is the case. The search is for the interpretation of meanings in social contexts. Macpherson, Brooker, and Ainsworth (2000) argued that case study design is very important because it provides extensive knowledge of pedagogy and its context. They further argued that the findings of a well-conducted case study could be relevant in other places.

Researchers in the field describe various types of the case study design. For example, Yin (1993) identified three types of case studies: (a) exploratory, (b) explanatory, and (c) descriptive. Stake (2000) also described three types of case studies: (a) intrinsic case study, (b) instrumental case study, and (c) collective case study. In an intrinsic case study, the researcher wants a better understanding of the case. In an instrumental case study, the case is used to understand more than what is obvious to the observer. In a collective case study, a group of cases are examined. For this dissertation study, I chose to conduct an in-depth examination of CDLI using an intrinsic case study

design method to better understand the case. CDLI is a unique case because it is the only virtual school in Newfoundland and Labrador, and it also makes extensive use of synchronous communication and interaction.

One aspect of the study involved the desire to acquire meaningful information to help understand the structure and organization, as well as the effectiveness and educational contribution of CDLI. The second aspect of the research was an examination of the development of CDLI in terms of programs, course technology, and pedagogy. McMillan and Wergin (2002) stated that, “Educational research is a systematic investigation, involving the analysis of information (data), to answer a question or contribute to our knowledge about an educational theory or practice” (p. 119). Also, the research process enhances our understanding of an issue (Creswell, 2012).

Several studies have been conducted on CDLI in the past (Barbour, 2005; Barbour, 2007; Barbour & Mulcahy, 2004; Barbour & Mulcahy, 2009; Dodd et al., 2009). Those studies covered particular aspects of CDLI, for example, the progress of distance education in Newfoundland and Labrador, the examination of school-based teachers' commitments to CDLI, and the impact of e-learning experience on rural students' university achievements and persistence. However, this is the first comprehensive research study on CDLI. The information gained from this study may better help inform rural students, parents of students, and rural educators about the structure and organization of CDLI, as well as their programs, course technology, and pedagogy. In addition to helping practitioners, this research study will potentially help policy makers. Finally, this research study will provide guidance to people interested in e-learning and in rural education on a national and international scale.

Siegel (2012) states that researchers use a wide range of methods and techniques to research a phenomenon. For this study, I used a qualitative and interpretive methodological framework. Another characteristic of qualitative research is that it depends on human perceptions (Stake, 2010). I was interested in knowing CDLI through the employees' frame of reference (Creswell, 2014). I wanted to understand the reality as CDLI employees had experienced it. The goal was to attain a detailed understanding of their perspectives. Throughout the study, my main focus was the description, as well as the explanation, of the participants' views. According to Guba and Lincoln (1981), naturalistic inquiry aims at understanding social realities and human perceptions. In this study, I focused on the meanings as seen by the participants. As Creswell (2013) demonstrates:

In this worldview, individuals seek understanding of the world in which they live and work. They develop subjective meanings of their experiences.... These meanings are varied and multiple, leading the researcher to look for the complexity of views.... Often these subjective meanings are negotiated socially and historically. In other words, they are not simply imprinted on individuals but are formed through interaction with others (hence social constructivism) and through historical and cultural norms that operate in individuals' lives. (pp .24-25)

Social reality is created by social actors while talking, discussing, lecturing, and doing. Social phenomena are dependent on interactional accomplishments. Social reality is constructed and varies from person to person (Gall, Gall, & Borg, 2003). Social reality has specific meanings and relevant structures for the beings living, acting, and thinking within it.

## **The Case**

The case for this study was the virtual school Center for Distance Learning and Innovation (CDLI). CDLI was established in 2000-2001 in Newfoundland and Labrador. Part of its mandate included the development and delivery of senior high school programming to rural high school students in the province.

At the time of this study, CDLI employed 46 staff including:

- a director,
- two training specialists,
- two program development specialists,
- a connectivity and communications specialist,
- an IT system manager,
- 29 E-teachers,
- a guidance counsellor, and
- nine administrative and support staff.

Staff members are located in 17 locations throughout the province. CDLI offers 42 senior high school courses to more than 1000 students. Approximately 110 schools from rural and remote isolated communities avail of CDLI courses. The courses are delivered by specialized teachers through online technologies.

In Newfoundland and Labrador, online learning at the school level has been delivered through CDLI since 2001. CDLI was established to equalize educational opportunities to rural high school students. In 2006, Memorial University received funding from the Social Sciences and Humanities Research Council of Canada (SSHRC)

and the Community-University Research Alliance (CURA) program. The research projects were conducted through the creation of the Killick Centre for E-Learning Research. The main focus of these research projects was K-12 e-learning. Barbour (2011) reported that (a) 15 co-investigators, (b) 10 community collaborators and (c) 10 community partner organizations participated in these projects. Under the CURA program, many studies were conducted on e-learning at the high school level. The topics included (a) the effectiveness of e-learning, (b) best practices in the e-learning classroom, (c) pre-service teacher training, (d) e-learning experiences of aboriginal students, (e) the impact of prior experience in transition to post-secondary education, and (f) historical study and leadership. For example, Philpott, Sharpe, & Neville (2009) did a research study in five coastal communities in Labrador to investigate perspectives of e-learning for aboriginal students. The findings made clear that e-learning was very important in these communities:

- students were able to meet the requirements for success;
- students developed their personal skills through e-learning;
- students reported that the E-teacher was central to their learning; and
- students believed that the online course delivery process was beneficial for them.

Some challenges were also identified and included communication challenges, motivational challenges, and contextual challenges.

Kirby, Sharpe, Bourgeois, and Greene (2010) also conducted a research study to investigate high school distance learners' participation in post-secondary education and their perceptions following their high school graduation. The findings showed that high

school e-learners preferred university studies, but were not interested in taking courses through online learning at the university level.

Along with the CURA program, other researchers such as Barbour, Mulcahy, and Stevens conducted independent research on CDLI on such issues as students' academic performance. Barbour and Mulcahy conducted three studies (Barbour & Mulcahy, 2006; Barbour & Mulcahy, 2007; Barbour & Mulcahy, 2008) and found no significant differences in the performance of students in traditional schools and online students. In another study, Mulcahy, Dibbon, and Norberg (2008) carried out research with three schools in coastal Labrador. Their findings indicated that in two of the schools a higher percentage of students enrolled in basic level courses rather than registering in academic level courses through CDLI.

From both programs of research, several topics related to e-learning at the high school level have been explored. The studies include:

- investigations on the development of distance education (Barbour, 2005; Barbour, 2008; Boone, 2008; Mulcahy, 2007; Galway & Collins, 2003);
- a review of the literature on virtual schools (Furey & Murphy, 2005);
- an examination of the effectiveness of distance education (Crocker, 2007; Seifert & Sheppard, 2009);
- the impact of high school e-learning on university education (Kirby, Barbour, & Sharpe, 2012; Dodd, Kirby, Seifert, & Sharpe, 2009);
- perceptions of distance education (Johnson, 2011);
- the role of on-site facilitators (Barbour & Mulcahy, 2009);

- online course design (Barbour, 2005);
- the need for change in teaching (Stevens, 2006; Stevens; 2007);
- online synchronous communication (Murphy, 2010); and
- the examination of enrolment trends in virtual schooling (Barbour & Mulcahy, 2013).

Still, as discussed above, there remains a paucity of research in the literature on rural education and K-12 online learning (DiPietro, Ferdig, Black, & Preston, 2008; Hannum, Irvin, Banks, & Farmer, 2009). Researchers in Newfoundland and Labrador have endeavored to explore various aspects of e-learning at the high school level, but there is still a lack of systematic research on CDLI. Little is known about how CDLI works, how courses are designed and delivered, what issues were confronted during their start-up, and how those issues were addressed.

### **Ethical Considerations**

Gall et al. (2003) suggested that the proposals for research studies that involve human participation need to explain the process of protection of possible risks and should be submitted to an agency or an institution for a review. Furthermore, they stated that, “Researchers must inform each individual about what will occur during the research study, the information to be disclosed to the researchers, and the intended use of the research data that are to be collected” (p. 69). A number of steps were taken to ensure the ethical integrity of my research study:

1. A detailed ethics application was submitted to the Interdisciplinary Committee on Ethics in Human Research at Memorial University of Newfoundland.

2. After obtaining approval, I contacted the director of CDLI to gain permission to approach employees. A detailed letter of consent (See Appendix A) was written that described the purpose, methodology, timeline, usage of data, and benefits of the study, as well as the measures that would be used to protect anonymity (Creswell, 2012).
3. Permission was also obtained from former and present employees of CDLI, including directors, e-teachers, program specialists, and guidance counsellors.
4. Another detailed recruitment letter was sent to the participants (see Appendix B). The letter included (a) contact information for my supervisor and I, as well as (b) information related to the topic of the study, (c) the purpose of the study, (d) the time commitment needed for the study, and (e) anticipated risks of participation in the study. Participants were informed that their involvement was voluntary and that they were free to withdraw from the study at any point. Participants were informed that this study was not being conducted on behalf of CDLI, nor was it a condition of employment. They were also informed that this study had been reviewed and received ethics clearance through the Memorial University Ethics Committee.

### **Sampling and Participants**

For this research study, 40 participants were contacted through email. One of the participants could not take part in the study due to previous commitments. Twenty-five of the participants did not reply to the initial email. After a couple of days, participants were sent a friendly reminder. They did not reply to the friendly reminders. Fourteen participants were willing to participate in the study. A detailed informed consent form



was sent to these participants (See Appendix C). The informed consent form contained (a) information regarding the focus of the study, (b) the contact information for my supervisor and I, and (c) the introduction and purpose of the study. Participants were also informed of (a) their role in the study, (b) their proposed time commitment, (c) the possible benefits of the study, and (d) the possible risks of the study. They were informed that every possible effort would be made to safeguard their identities, their personal information, and data from unauthorized access, use, or disclosure (Gall et al., 2003). They were informed that their names and addresses would be removed from the data and pseudonyms would be used instead.

The participants were also informed that the data would be collected through interviews, and that the interviews would be recorded through an audio-recording device. The informed consent letter detailed that data would be stored in a locked filing cabinet and all electronic data would be stored on password-protected devices. In addition, the letter contained the plan to disseminate the study's findings in a published dissertation, in journal articles, and in conference presentations. These documents would all be publically available. Through the informed consent letter, permission was sought to audio record the interviews and to use direct quotations.

The participants of the study, present and former employees of CDLI, were purposefully selected to gain better understanding of the case. Researchers state the importance of purposive sampling as being typically small and also claim that qualitative research uses purposive sampling to best understand the phenomena (Creswell, 2012; Gall et al., 2003). The decision to choose the present and former employees of CDLI was

important for the insight they could provide into teaching, learning, and the development of CDLI.

### **Data Collection**

According to Yin (2003), data for case studies can be collected through six possible sources: (a) interviews, (b) documents, (c) archival records, (d) direct observation, (e) participant observation, and (f) physical artifacts. The data for this study were obtained through interviews and documents.

### **Interviews**

According to Scott and Usher (2011), “Interviewing is an essential tool of the researcher in educational enquiry. This is because the preconceptions, perceptions, and beliefs of social actors in educational settings form an inescapable important part of the backdrop of social interaction” (p. 115). Furthermore, Seidman (2013) argued that in qualitative research, the participants are active subjects and their viewpoints open doors for researchers to have access into their lives. He went on to say that the main purpose of an interview is to capture the experiences of other people and to understand them through their frame of reference.

According to Roulston (2010), interviews are the most commonly used form of data collection in qualitative research. Despite some challenges posed by interview procedures, there are also many benefits. According to Cassell and Symon (2004), the interview method is the most flexible method in qualitative research. It is through interviews that different meanings are explored. The interview method was readily accepted by most of the research participants.

I interviewed the study's participants over a period of six months. The participants were representatives of all areas of CDLI (e.g. (a) administrators, (b) a program development specialist, (c) a guidance counsellor, (d) a communication and connectivity coordinator, and (e) E-teachers). Typically, all interviews took place on weekdays. Depending on participants' physical proximity and preference, interviews were conducted either face-to-face or over the telephone. Regardless of proximity, participants were given a choice as to where they were interviewed, i.e. face-to-face or by telephone, or on the university campus or in another location. The interview questions were emailed to each individual in advance (see Appendix D). Following the interviews, I kept a journal tracking issues that emerged during the data collection process.

### **Telephone Interviews**

Four participants were interviewed by telephone. First, I emailed them and requested a contact telephone number. Then, I asked them their preferred time for the telephone interview. One of the four participants was initially interviewed using Blackboard Collaborate. After the interview was completed and I listened to it several times, I realized that the quality of the voice was unclear. I asked the participant if we could conduct the interview again over the telephone and the participant agreed. I interviewed him again, asking the same questions. On the scheduled day, I called the participant from my personal cell phone and asked if he was ready for the interview. After he complied, I interviewed him, asking the same questions as before. I turned on the microphone on my cell phone as well as the digital recording device. To guarantee a quality recording, I also turned on the recording application on my cell phone. I called all four participants from my on-campus office in this manner, ensuring our privacy by

closing my office door and interviewing them when there were no other people in the office.

### **Face-to-Face Interviews**

I interviewed ten participants face-to-face. Eight of those 10 participants travelled to campus for the interviews. I interviewed them in different rooms at the G.A. Hickman (Faculty of Education) Building. Two of the participants were unable to come to campus due to work commitments, so I travelled to their workplace and conducted the interviews in their offices. One of the participants worked in St. John's. One of the participants lived and worked in Gander, so I travelled by car to Gander to interview the participant. The trip, in total, took approximately eight hours of driving time. The duration of the interview was one and a half hours.

Regarding face-to-face and telephone interviews, the literature suggests that the mode of interview might produce different results. For instance, some researchers argue that telephone interviews may increase response quality for sensitive topics (Fenig & Levav, 1993). Telephone interviews often help obtain data from reluctant participants and from participants who live far from the interviewer (Tausig & Freeman, 1988). It can also be a cost saving and time-efficient mode of data collection with low refusal rates (Block & Erskine, 2012; Sturges & Hanrahan, 2004; Trier-Bieniek, 2012).

In contrast, Sturges and Hanrahan's 2004 research study concluded that there were no significant differences regarding the findings of interview modes (2004). Therefore, qualitative researchers were encouraged to use telephone interviews. Sobin et al. (1993) also claimed that telephone interviews were an acceptable mode of interview. Trier-Bieniek (2012) argued that participant-centered interviews empowered the participants.

This study's data were obtained through semi-structured interviews. Merriam and Tisdell (2015) described the five characteristics of semi-structured interviews:

1. interview guide includes a mix of more and less structured interview questions;
2. all questions used flexibly;
3. usually specific data required from all respondents;
4. largest part of interview guided by list of questions or issues to be explored; and
5. no predetermined wording or order (p.110).

I emailed the interview questions to the participants before the interview date so they could have an opportunity to think about their answers in detail beforehand and more easily respond to the questions. I interviewed each participant once and each session lasted from one hour to one and a half hours in length. Each interview was audio-taped. After taping, the interviews were transcribed. The length of the transcripts was between 12 to 60 double spaced pages, for a total of 380 pages. Upon completion of the interview transcription, I contacted one participant for clarification on points that were raised in the interview. Therefore, I interviewed the participant face-to-face for the second time on those issues that needed clarification. Copies of the transcripts were electronically forwarded to the participants for review. I also informed the participants that they could edit the transcripts for any inaccuracies they perceived.

### **Documents**

Data for this study were also generated through document analysis. The documents for analysis included the official CDLI website and reports and papers

previously published on CDLI (See Appendix E). I also included a blog "Not Banjaxed ...Yet: Give it Time" by Maurice Barry (2013), who worked with CDLI for 13 years and was involved in the Legacy Model, which will be discussed further in Chapter Four.

Merriam (1998) pointed out that, "Documents of all types can help the researcher uncover meaning, develop understanding, and discover insights relevant to the research problem" (p. 118). According to Stake (1995), document analysis provides rich description of phenomena in a qualitative case study. Additionally, Creswell (2012) asserted that documents are ready for analysis without any further transcription and allow a researcher to understand the main phenomena. Creswell explained that some documents may not be easily available to the public. However, all documents used in this study were available in the public domain.

The other purpose of using document analysis in this study was as a means of triangulation (Denzin, 1970). In addition to triangulation, the document analysis method is beneficial for qualitative researchers. Bowen (2009) defined document analysis as a systematic process of reviewing documents that are often presented in various forms.

### **Data Analysis**

The data analysis stage in qualitative research is a critical one. According to Creswell (2012), "Analyzing qualitative data requires understanding how to make sense of text and images so that you can form answers to your research questions" (p. 236). Regarding data analysis within a case study, Gall et al. (2003) stated that, "Data collection is emergent in case study research" (p.449). Accordingly, my informal data analysis started while data collection was in progress.

## **Interviews and Documents**

Data analysis began with multiple readings of each transcript. The text of each transcript was then broken into units of analysis. In the text of transcripts, the unit of meaning was used as the unit of analysis.

All the recorded interviews were transcribed by using the OTranscribe web application. OTranscribe is a free web app that facilitates the transcription process. Through this web app, the keyboard of the computer performs most of the functions, such as (a) speed control, (b) rewind, (c) fast forward, (d) play, (e) bold, (f) italics, and (g) interactive timestamps. The data are saved automatically, and the researcher can also export the files to Microsoft Word. The transcription process helped me get a sense of the data. I interviewed one participant over the telephone whose accent was difficult to decipher. Therefore, I hired a professional transcriber for that interview. The transcriber was expensive and was not aware of some of the terminology used by the participant. Still, I listened to the transcript repeatedly and made some corrections regarding terminology. I transcribed the remaining interviews myself. The transcription process helped me in different ways, for example, to develop an increased familiarity with the data and to practice writing analytical memos. Merriam and Tisdell (2015) heralded the advantages of self-transcription, recommending that all novice researchers transcribe interviews themselves.

In terms of document analysis, I also wrote a summary of each document and noted any additional information, such as type of document, summary of its contents, and ideas about other documents (Gall et al., 2003). The documents were analyzed in various stages that included the finding and synthesizing of data, which were also available in

documents. The document analysis provided data in excerpts, quotations, and entire passages (Bowen, 2009).

All transcripts and documents were manipulated by using the Computer Assisted Qualitative Data Analysis (CAQDAS) software NVivo. The NVivo software did not analyze the data for me, but facilitated the data analysis process by allowing me to classify and arrange the data; examine relationships in the data; and combine analysis with linking, shaping, searching, and modelling the data. According to Saldaña (2015), if a student's research project consists of multiple interviews, CAQDAS becomes an integral part of data analysis. I used CAQDAS because the collected data were more than 300 hundred pages, because I am comfortable using computers, and because the data needed a close inspection of every word (Creswell, 2012).

Merriam and Tisdell (2015) stated that the selection of correct CAQDAS takes some time. I applied various strategies to CAQDAS. First, I discussed using CAQDAS for data analysis with my colleagues. Then, I contacted faculty members who have been using some sort of CAQDAS. I also searched for CAQDAS on Google. I read the reviews of the consumers who had already used this software. Additionally, I compared the prices. Eventually, I found NVivo as a CAQDAS was more reliable and cost effective and had many extra features.

I first checked the interview data for accuracy by reviewing the interviews while simultaneously listening to the original tape-recorded interviews. All data were saved in separate files. I read and reread all transcripts one at a time very carefully. Then, I made notes about my first impressions. I broke the text into meaningful segments. These segments were labelled as nodes in NVivo. I looked for the unit for analysis, which



contained one item of information. Then, a list of categories was established. These categories were grounded in the data that I collected. After that, these categories were combined into sub-themes. Finally, sub-themes were merged into the main themes.

Saldaña (2015) asserted the purpose of analytic memos: “Analytic memo writing documents reflections on: your coding processes and code choices; how the process of inquiry taking [sic] shape; and the emergent patterns, categories and subcategories, themes, and concepts in your data - all possible leading toward theory” (p. 44).

Throughout the data analysis process, analytic memos were used.

### **Trustworthiness**

Various arguments are presented against the trustworthiness of case study methodology. For example, case study is subjective, a single case cannot be generalized, and validity is needed for the findings (Flyvbjerg, 2006). To make sure that the findings and interpretations are accurate, a researcher uses various strategies during the data collection and analysis processes (Creswell, 2012). Unlike quantitative researchers, case study researchers hold different views about the validity and reliability of case study findings (Gall et al., 2003). I addressed the issue of validity and reliability in a number of ways. Merriam and Tisdell (2015) suggested that validity and reliability can be addressed through careful attention to how the data are collected, analyzed, and the findings are presented. Researchers suggested some strategies to validate the findings, such as example triangulation and member checking (Creswell, 2012; Galle et al., 2003; Stake, 1995).

Lincoln and Guba (1985) described four criteria used by constructivist researchers to achieve trustworthiness: (a) credibility, (b) transferability, (c) dependability, and (d)

confirmability. Each of these aspects confirms the accuracy of the research. I used the following methods to make sure that the data were credible: (a) triangulation, (b) member checking, (c) peer debriefing, and (d) prolonged data gathering. Triangulation was achieved by interviewing different participants who were representatives from all areas of CDLI such as (a) the director, (b) a guidance counsellor, (c) a program development specialist, (d) a technical coordinator, and (e) E-teachers with different specializations. Triangulation was also gained through different types of data collection. For this study, I collected data through interviews and document analysis. For member checking, participants were given the opportunity to check the accuracy of my findings. Additionally, peer debriefing occurred through continuous dialogue with individuals working on-campus who are or were involved with online distance education, specifically with CDLI. Peer debriefing also occurred through discussions with members of my supervisory committee. Finally, the data were gathered over a period of six months.

In terms of reliability, it is true that if I were to repeat this study, I may not achieve the same results. There are various reasons for this; the social world is constantly changing, how information is gathered is changing, and the skills of the interviewer could change (Merriam & Tisdell, 2015). There has been an ongoing debate regarding generalizability in case study research. The proponents of natural science argue that a single case cannot be generalized. However, other researchers argue that case study findings can be generalized. Flyvbjerg (2006) argued that it depended on the case and its selection. Gall et al. (2003) also supported the point that generalizability can be achieved by choosing a case, which is typical of the phenomenon. Macpherson et al. (2000) argued that, "It is the richness of the detail provided by a well conducted case that develops

insights that have resonance in other social sites, thereby, allowing theoretical connections to be explored and established” (p. 52). I have endeavoured to ensure transferability by providing thorough description. Readers can then judge the degree of transferability based on the descriptions within the study. Readers may be able to compare the context of the study with their own contexts. In this research, CDLI was typical of the phenomenon of being the only virtual school in the province. In this study, findings should not be generalized because of the small number of participants, but the study can be beneficial for organizations that are in similar situations.

According to Guba and Lincoln (1981), dependability is best established by the use of an audit trail. It can be helpful for an external auditor to examine the process. I established an audit trail by archiving all interview audio tapes, interview transcripts, participant agreements, and documents relevant to my study. I also established confirmability to make sure that the study was the product of the research that was conducted. For confirmability, I followed the audit trail by keeping a file for data collection and analysis, as well as a journal with my insights on interviews and subsequent emerging issues. The CAQDAS facilitated the process of audit trails.

### **Researcher Positioning**

I was born and raised in a rural community in Pakistan. My rural roots are inextricably linked to my identity. I am acutely aware of issues that rural communities face such as out-migration, geographical isolation, poor infrastructure, and declining economy. In addition to the aforementioned issues, I am also aware of issues related to schooling in rural communities. Holloway and Biley (2011) described the qualities of a qualitative researcher. A qualitative research account is a sort of storytelling. Qualitative

researchers collect, transform and interpret knowledge. They write a story as well as analyze it. They are responsible for the data and its interpretation. They should pay special attention to the emotions of the participants and interpret them in the research account. Personal involvement makes qualitative research interesting. A researcher's involvement in data collection, data analysis, and reporting is an integral part of qualitative research. A researcher's feelings and experiences influence qualitative research. Therefore, qualitative researchers should move beyond themselves. Our experiences and knowledge are resources to explore the ideas of others. Qualitative researchers provide participants opportunities to express themselves.

Gall et al. (2003) argued that the researcher plays the role of a measuring instrument. They further argued that the researcher performs all activities such as the data collection and decision making about appropriate sites and gaining permission from gatekeepers. They argued that gaining entry to sites is crucial to developing relationships with the participants and offered issues involved with gaining entry:

1. identifying people within the field setting with whom to make your initial contact;
2. selecting the best method of communication (e.g., telephone, letter, or personal visit) to deliver your request;
3. deciding how to phrase your request (e.g., focusing on the site's opportunity to contribute to research or on personal benefits to site participants); and
4. being prepared to answer questions and address concerns that might arise both before and after permission is granted. (p. 445)

I did not have any knowledge of CDLI before commencing my master's program at Memorial University of Newfoundland. During my master's program, I learned about

CDLI, and wrote a few research papers on the Centre. I did have research experience before conducting this research study. In this study, I related myself as an instrument. As a researcher, I engaged in the situation and made sense of it. Being a researcher, educator, and an advocate for rural education, I have special interest in K-12 online learning. I showed great attention to particulars in this research. My experience and my background helped me to conduct this study.

### **Chapter Summary**

In this chapter I discussed the research design and methods for this study. The reasons for choosing the case study method were also discussed. Prior to recruiting the participants, I sought ethics permission from the university's ethics committee. Fourteen participants from different areas of CDLI responded to the call for participation. The data were collected through interviews. I utilized both types of interviews: telephone interviews and face-to-face interviews. The other source of data collection was documents. All participants' interviews were transcribed. All the data were analyzed by using the CAQDAS software NVivo. NVivo facilitated coding by organizing and managing the interview data and documents. Issues of trustworthiness were addressed by focusing on different strategies. I also presented the description of myself as a researcher. The purpose of the next chapter is to present the findings of the study.

## Chapter Four

### Findings

The purpose of this chapter is to present the results of a qualitative inquiry using case study methodology into the genesis and development of the Centre for Distance Learning and Innovation (CDLI). CDLI was created in 2000 as a result of recommendations put forward by a government-appointed Ministerial Panel in a report entitled *Supporting Learning* (Sparkes & Williams, 2000). The foremost mandate of CDLI is to equalize educational opportunities for students attending the province's small rural schools.

This chapter presents the key findings obtained from the collected data as a result of this study. The data were collected through interviews and document analysis. Over a period of six months, the 14 participants in this study shared their views, perceptions, and experiences about CDLI. Topics covered included the genesis of CDLI, its stages of development, challenges, program development, and pedagogy. I gave the participants fictitious names in order to protect their privacy and provide confidentiality. I named the participants Jason, Jack, Tom, James, Jacob, Alex, Nathan, Emily, Jessica, Laura, Martin, Daniel, Emma, and William. The participants were representatives of all areas of CDLI (e.g. (a) administrators, (b) a program development specialist, (c) a guidance counsellor, (d) a communication and connectivity coordinator, and (e) E-teachers). Each participant contributed to my overall understanding of CDLI. Each participant spoke about the inception of CDLI, CDLI's challenges, and how they faced the challenges. They also

talked passionately about the nature of teaching and learning through CDLI. In addition to the interviews, the data were collected through document analysis. The documents included reports, published papers, a blog, and CDLI's official website (see appendix for document list).

All the recorded interviews were transcribed by using the OTranscribe web application. Additionally, the Computer Assisted Qualitative Data Analysis (CAQDAS) software NVivo was used to analyze the data. NVivo facilitated the data analysis process by allowing me to classify and arrange the data; examine relationships in the data; and combine analysis with linking, shaping, searching and modelling. The findings of the study will be presented as a series of themes. The themes are:

- Genesis of CDLI
- Pilot Year
- Growth and Development
- Evolution of Technology
- E-teachers
- Pedagogy
- Continuing Challenges

### **Genesis of CDLI**

The purpose of this section is to describe the genesis of CDLI. To do this, I will provide a brief overview of the development of distance education in Newfoundland and Labrador. First, I will provide the description of the Legacy Model of Distance Education.

This model signifies the first efforts to provide academic courses via distance education for small rural schools in the province. Then, I will focus on the Vista Project. Finally, I will discuss the establishment of the Ministerial Panel and its consultation and recommendations, and how these led to the formation of CDLI.

### **The Legacy Model of Distance Education**

What has come to be known as the “Legacy Model” of distance education was established in Newfoundland and Labrador in 1988. Boone (2008) reported that “in the early 1980s, the Department of Education recognized that there were some serious [program] challenges in small rural [high] schools as a result of declining enrolments” (p. 20). Boone further described the challenges such as lack of qualified teachers and lack of facilities needed to offer some of the senior high school courses such as Physics and Chemistry. As a result of declining enrolment, in 1986, Dr. Frank Riggs, a Professor of Education at Memorial University, was appointed by the provincial Department of Education to conduct a study of small schools in the province (Barry, 2013). Johnson (2011) explained that the main purpose of the project was to investigate problems peculiar to small schools with an aim toward developing proposals to enhance educational opportunities for students in these schools. The *Report of the Small Schools Study Project* was published in January 1987. Riggs (1987) identified concerns related to the programs and courses at the secondary school level. According to Riggs (1987), “Today many high schools offer only a minimum program and there is still, when one considers the smallest and largest schools, extensive variety in program offerings” (p.25).



Riggs (1987) recommended distance education as a solution to the issue of providing smaller high schools a comprehensive curriculum. Some of his specific proposals can be seen below:

- Recommendation 3.4- That by direct classroom teaching or by distance education, all senior high schools should have the ability to offer all courses which are prerequisite to entry into post-secondary institutions and the ability to accommodate particular course requirements of small numbers of students. (p. 26)
- Recommendation 3.5- That measures be taken to ensure that a course in high school chemistry level 2 (Grade 12) and a course in high school physics level 2 (Grade 12) are available to small high schools by September 1987. Consideration should be given to delivery by computers, audio-video tapes or by other means of distance education. (p. 27)
- Recommendation 3.6- That greater use of technology be made in program delivery in small schools; especially in small high schools. (p. 28)
- Recommendation 3.7- That a Distance Education School be established and a principal and teachers be employed to assume responsibility for the development and administration of distance education courses. (p. 28)

Boone (2008) stated that as a result of Riggs' recommendations, two senior executives, Dough Young and Wilbert Boone, of the Department of Education researched distance learning models in other Canadian provinces including Ontario, Alberta, and British Columbia. Based on that research, Young and Boone recommended a distance

learning model for small rural schools in the province. Henceforth, in this dissertation, this model will be known as the Legacy Model. Both executives recommended the use of synchronous teaching and learning in that model. In synchronous learning, learning interactions and communications between teacher and students occur in real time. However, in terms of place, students may be separated from one another or from their teachers. In September of the 1988-1989 school year, the Grade 10 Advanced Mathematics course was offered in 13 pilot schools through distance education using the Telemedicine Education and Technology Resource Agency (TETRA) network, located at the Health Sciences Centre in St. John's (Johnson, 2011). Barbour (2007) explained that the TETRA network used an analog, rather than a digital network; a combination of audio graphic technology and telewriters. A telephone-based conferencing system was used to link the classrooms. All students were taught synchronously. The project became very popular and, as a result, more courses were offered through TETRA. Similarly, many other schools showed their interest in the project and became a part of it.

With the passage of time, the Legacy Model grew. Barry (2013) described the growth of the Legacy Model. He stated that in 1989 and 1990, Grade 11 and Grade 12 Advanced Mathematics were added, respectively. In 1991 and 1992, Grade 11 and Grade 12 Physics and Core French were added, in that order. In 1995 and 1996, Grade 11 and Grade 12 Chemistry were added, respectively. Not only did the course offerings broaden, but also the number of schools reached by the program. By 1996, over 80 small rural schools participated in the program. Students from all rural areas of the province participated. Instructors were located throughout the province. Provincial examination

results showed that distance education achievement and completion rates were on par with face-to-face classes. One of the participants in this study talked about the types of students enrolled in the Legacy Model. He stated, “As far as I was concerned, the Legacy Model was only for very high achieving students. I mean they were advance students that were involved.” The issue of which students that distance education should serve in the province is one I will deal with extensively later in this dissertation.

### **The Vista Project**

In 1998, with funding from Industry Canada and the collaboration of STEM~Net, the Vista School District, and the Faculty of Education, four Advanced Placement online courses (Physics, Chemistry, Biology, and Mathematics) were developed and offered to rural students within the Vista School District. Eight sites were electronically linked to each other within the Vista School District (Stevens, 2006). The delivery system used a combination of WebCT, NetMeeting (with a MeetingPoint bridge for enabling multi-site classrooms), and KnowledgeForum for delivery. In 1999, a Grade 10 Art Technology course was also developed and offered through the same media technologies as used for the Vista Project. During that year, two more districts were added to the project. The Learning Management System (LMS) used in the project had (a) student email, (b) online testing tools, (c) a drop box for submission of work, (d) a discussion forum and (e) a grade book. The project was a great success and paved the way for K-12 online learning province-wide.

The Legacy Model of distance education and the Vista Project paved the way for online learning in this province. Through the Legacy Model high school courses were

offered using technology. Under the Vista Project online courses were offered to high school students in rural schools. Both the Legacy Model and the Vista Project played a major role in the establishment of CDLI.

### **The Establishment of a Ministerial Panel**

In 1999, the Government of Newfoundland and Labrador appointed a Ministerial Panel on K-12 educational delivery in the province to address the issues of curriculum equity, changing demographics, teacher shortages in specific teaching disciplines, and cost effectiveness (Johnson, 2011). According to Sparkes and Williams (2000), “the general mandate of the Panel was to examine the education system and advise on ways to advance the reform process and address the outstanding issues of improvement and effective program delivery” (p. 2). One of the terms of references of the panel was to “examine the current educational delivery model and consider alternate approaches” (p. 3). The Panel used a consultation process and made a large number of recommendations. Chapter 6 of the report, *Supporting Learning*, was devoted to distance education.

#### **Consultation and recommendations.**

From the document analysis, I found that the Ministerial Panel had focused discussions during the consultation process with a variety of stakeholders such as teachers, parents, students, special interest groups and advocacy groups. The panel also used a wide range of approaches for consultation. For example, Sparkes and Williams (2000) reported that the panel had (a) six half day community forums attended by 15-20 stakeholders, (b) 79 separate meetings with individuals, (c) two meetings with the

consultation committee, and (d) a one-day education forum attended by 60 participants. Additionally, the panel also reviewed the available local and international literature on some specific issues including (a) small school issues, (b) class size, (c) teacher allocation and workload, (d) the use of specialists and alternative staffing arrangements, (e) distance learning, (f) programming for special needs students, (g) teacher training, and (h) professional development (Sparkes & Williams, 2000).

The Panel submitted its final report *Supporting Learning* in March 2000. The Panel recommended the creation of a Center for Distance Learning and Innovation (Barbour & Mulcahy, 2004). One of this study's participants stated, "Chapter six of the report spoke to the expanded needs of rural schools which were not being met by using the current system and it recommended the establishment of [a distance learning] center, which was turned into CDLI." The document, *Supporting Learning*, identified the special challenges of rural schools such as (a) students' lower performance, (b) teacher shortages, (c) unique socio-economic conditions of many families, (d) declining enrolment, and (e) programming challenges. According to Sparkes and Williams (2000), the changes related to distance education were outlined in chapter six of the final report *Supporting Learning*. In this report, four key recommendations provided the direction for the new online distance learning model:

- Recommendation 58-that the province embark on a program to substantially increase the scope of distance education offerings in the schools through the establishment of a "Centre for Distance Learning and Innovation."

- Recommendation 59-that the Centre for Distance Learning and Innovation consist of a number of teachers, who may be termed Electronic Teachers or E-teachers, with primary responsibility for course delivery and evaluation and that, at the school level, teachers be assigned from the regular school allocation as mediating teachers to ensure appropriate interaction between students and E-teachers.
- Recommendation 60-that an approach be taken to content packaging and delivery that is not totally dependent on high bandwidth technologies.
- Recommendation 61-that most communications be through an internet-based system incorporating e-mail, conference forums, Internet, fax and similar devices, with minimal reliance on synchronous communications, fixed schedules, or other constraining elements. (Sparkes & Williams, 2000, p. 73)

Also in the report, the strategy for the implementation of CDLI in three phases was outlined:

1. essential programming for all rural high schools;
2. resources for teachers;
3. integration of all distance learning activities, including long term planning for development and delivery, research, and technology transfer.

Study participants described the mandate of CDLI. As well as distance education, CDLI had two other mandates: (a) teachers' professional development (b) leadership in information communication and learning technologies (ICLT). The participants explained that teachers' professional development was done through a partnership with the Newfoundland and Labrador Teacher Association (NLTA). The Virtual Teacher Center

(VTC) had been established in 2000 as a partnership between the Department of Education and the NLTA. Regarding the establishment of leadership in ICLT, the participants reported that over time that goal expanded.

The Ministerial Panel recommended a very significant change to distance education delivery. It recommended the use of an asynchronous mode of teaching and learning. As Sparkes and Williams (2000) described, “Internet-based distance learning offers the opportunity to move away from the scheduling constraints of synchronous programming and to help students become accustomed to new ways of learning and to the technologies that are becoming all-pervasive in daily life” (p.72). In the Legacy Model a synchronous mode of teaching and learning was used. It is noteworthy that during the implementation of CDLI, in the pilot year, management decided to reject the Panel's recommendation to implement an asynchronous model of distance education and maintained a synchronous component.

### **Pilot Year**

The Government document *Supporting Learning* was released on March 31, 2000 (Sparkes & Williams, 2000). As noted above, this document recommended major changes to distance education in the province. The Panel believed that such changes would enhance educational opportunities for students who attended small rural schools and result in the increased equality of educational opportunities. Within months of its publication, the Centre for Distance Learning and Innovation (CDLI) was created and was charged with the responsibility of creating a new online delivery system. In effect, CDLI would become the province's virtual school.

**Initial Administrative Team**

Participants in this study responded to questions regarding CDLI's initial administrative team. Jason described the initial structure of CDLI. He stated that when CDLI was established, Wade Sheppard was appointed its first director. Before joining CDLI, Sheppard was the director of the Vista School District. The first person Sheppard brought to CDLI was Leon Cooper, who had a significant background in e-learning. Cooper was program specialist for Technology Education. He also had been brought on board at the inception of the Legacy Model. Cooper prepared the manual and other print materials used for the Legacy Model. He had significant involvement in STEM~Net and the Vista Project and had a firm grasp of web contents and processes. Cooper would be responsible for supervising the development of the 10 courses that would be initially developed for CDLI. He also trained all the content developers.

Alex Hickey, the director of the Virtual Teacher Centre (VTC), also became part of CDLI in its early days. During the pilot year, Maurice Barry was responsible for program implementation. After the retirement of Leon Cooper, Barry moved to program development, and Bob Hipditch took on the responsibility of program implementation, essentially becoming the principal of the new virtual school. Frank Shapleigh was responsible for school connectivity and equipment, and Dale Fraser maintained back-end systems including the website, the Learning Management System WebCT, and the Tutor's Edge synchronous tool. Participants in this study reported that all personnel reported to Wade Sheppard.



*Supporting Learning* (2000) suggested that there was no need for CDLI to begin with a pilot year. As the report stated, “Note that no pilot phase is proposed. Sufficient experience exists locally and elsewhere to justify [an immediate] start” (Sparkes & Williams, 2000, p. 81). CDLI leadership believed otherwise and decided that a pilot year was necessary and would be advantageous for future growth and development. This study’s findings indicate that the pilot year was very challenging. As one participant, James, remarked “We had a whole lot of work to do in that first year.” The administration of CDLI faced many difficulties, including running both the new CDLI online model and the Legacy Model, which had been in place since 1988. In addition, there were issues related to connectivity, initial E-teacher and m-teacher training, and learning to use new technologies. The purpose of this section is to describe the key events of that pilot year and the valuable knowledge that was gained from that experience.

### **Pilot Year Key Events**

This section will focus on the key events of the pilot year of CDLI. The events include the initial offering of online courses and the initial challenges of starting the pilot year. In this section, I will also focus on some important early events such as E-teacher recruitment and training, the decision to moving all courses from the Legacy Model to CDLI, and issues with technology usage.

During the 2001-2002 school year, 10 internet-based distance education courses were developed and piloted through CDLI in 10 English speaking districts (Barry, 2013). Each district was responsible for delivering a web-based course, selecting a mediating teacher for each school, and appointing an E-teacher (Barbour & Mulcahy, 2004).

Approximately 200 students from 76 different rural schools participated in the pilot year (Barbour, 2005). Barry (2013) viewed the pilot year as a very important year. He explained that what was learned in that year would inform future development decisions for CDLI. Jason explained that CDLI offered the following 10 courses in the pilot year: Communication Technology 2200/ 3200, Canadian History 1201, Chemistry 2212, Enterprise Education 3205, Math 1204, Math 2204, Math 2205, Physics 2204, French 2200, and Writing 2203. He also pointed out the courses that continued to be offered with the Legacy Model during that year, including: Chemistry 2202, Chemistry 3202, French 2200, French 3200, French 3201, Math 2205, Math 3201, Math 3105, Physics 2204, and Physics 3204. James pointed out that one city school district from St. John's also participated in the pilot year because it was believed that distance education should be available to urban as well as rural students. The following year that urban school district stopped participating in CDLI courses either because students were not interested in online learning or their school offered all the courses on campus.

According to Barry (2013), his initial role with CDLI was as developer of the pilot Grade 11 physics course, and he was charged with the responsibility of orchestrating the piloting of the 10 online courses that had been developed. In his blog, *K-12 Distance Ed. in NL-8: CDLI Startup and Pilot Year (2000-2002)*, he described this as a “daunting task” for the following reasons:

- In the field there was skepticism of the new model. In many minds the old system (I renamed it the Legacy Model as I thought ‘old’ at the time had the wrong tone) worked well so people wondered why we should change it.

- The “Supporting Learning” model was advocating a primarily asynchronous model; a model that ran against what had been done previously.
- Internet connectivity was nowhere near where we wanted it to be. The majority of the rural schools used a hybrid model that used a satellite for downloads and a dial-up connection for uploads and it was quite congested as we here in NL shared the system with most of North America. Once the U.S. woke up for the day the system often became hopelessly slow.
- In many quarters there was a strong skepticism against distance education in any form.

Another participant, James, described the pilot year,

2001 would have been the rollout year. So on September 2001, we had 10 courses ready to go, offered in each of the 10 districts, not 10 in each of the 10 but one in each of the 10 districts. So we had the old system of distance education simultaneously going on [at] the same time we were rolling out this new system.

Thus, in the pilot year, both the Legacy Model and CDLI were running.

Most of the participants reported that CDLI was a continuation of the Legacy Model established in 1988. However, CDLI differed from the Legacy Model in significant ways. For instance, CDLI had an online delivery model, whereas the Legacy Model was based on telecommunications via the older Tele-Medicine network. Another major difference reported was that in the CDLI model students had access to videos,

whereas the Legacy Model only provided audio sessions. Laura stated the difference in her words:

The CDLI model differs from the Legacy Model in that it is web-based, whereas the Legacy Model was based on telecommunications via Tele-Medicine. So rather than the students having a website dedicated to their course and teacher interaction, what they had was student manuals.

However, switching from the Legacy Model to CDLI was not an easy task, as Jacob stated: “The Legacy Model was there. It was trusted, people had faith in it, the numbers [exam results] were steady and strong and all of a sudden we were coming to an online territory.”

The challenges of the pilot year were ameliorated by the fact that the E-teachers had been carefully selected, the CDLI administrative team were actively involved, and district program specialists were very helpful and supportive.

Another participant, Jacob, discussed similar challenges. He also pointed out that he was concerned about public exams. According to Jacob, marks on public exams were “a good measuring stick.” He stated, “I said, ‘let’s move over everything to the new model except the public exam courses.’ In the first year with CDLI all public exam courses were kept on the Legacy Model.” However, Jason reported that “we found that at the end of our first actual year, the teachers and the students in the Legacy Model said ‘we want to move over to CDLI.’”

### **No Guidelines to Follow**

Since CDLI was a new entity, there was no road map to follow. One of the administrators of the early years, Jacob, stated, “Because there was a new path you were getting into and there was no guidelines, so we made the guidelines as we went along.” Jason also explained: “There was nothing else we could pattern on. We always found that what CDLI was doing was probably the first instance of that [sic] have been done in the world. So, it was very difficult to find good advice from other places.” To cope with this issue, Jason reported that they spent a lot of their time in research and development. They continued to try new and different things.

### **Initial E-teachers**

*Supporting Learning* envisioned that responsibilities of E-teachers would include course delivery and evaluation, and regular communication with students and with the mediating teachers (Sparks & Williams, 2000). Before the pilot year could start, CDLI had to recruit and train the E-teachers that would be teaching the online courses. CDLI administration requested that each English school district existing at the time provide a temporary one-quarter teaching unit. In terms of E-teacher recruitment, Jason stated, “We had 10 teachers who had been nominated by the school districts for one year quarter time delivering the pilot version of the courses.” Most of the E-teachers had some experience in distance education because they had already worked with the Legacy Model.

**A blended model of synchronous and asynchronous interaction.** *Supporting Learning* recommended an exclusively asynchronous model. Sparks and Williams (2000)

described in the report, “Internet-based distance learning offers the opportunity to move away from the scheduling constraints of synchronous programming and to help students become accustomed to new ways of learning and to the technologies that are becoming all-pervasive in daily life” (p. 72). In the pilot year, the CDLI management team went against the government document and decided the new online distance courses would be a model that blended synchronous with asynchronous interaction and communication. As participant, Jason, commented,

The pilot year was...a difficult year for everybody. But, as had been the case with the Legacy Model, numerous challenges had been faced and were...dealt with. For example, early on the decision had been made to ensure that CDLI had a very strong synchronous component. So that the decision for the synchronous component was made primarily by me, but under the advice from the people involved—people from the Legacy Model, from the existing CDLI teachers, and people from the field. It had been judged that if we don't continue with [a] synchronous model, we are likely to going to lose a lot of students because the students wouldn't continue with the course without active support from the teachers in real time. So, this continued.

In his blog, Barry (2013) explained the reasoning behind CDLI going against the recommendation of *Supporting Learning*:

The people involved directly in the delivery, including the pilot teachers, did not need to be convinced that switching away from synchronous classes would

be a bad idea. In fact, all were adamant that a synchronous component was necessary for success.

We knew, internally, that we did not possess the ability to create truly engaging, immersive multimedia content. In short, we knew our limits—we'd learned lessons from both the Legacy and Vista models on what the students needed and on what could be done.

### **Technology and Connectivity**

Connectivity was one of the major challenges in getting CDLI up and running in the pilot year. Jacob reported that in the pilot year they received many complaints from school principals regarding connectivity issues. Jason talked about the connectivity issue and acknowledged that it was one of the major issues in the early days of CDLI. He described the connectivity: "Newfoundland and Labrador is very, very sparsely populated. It has very few large centers and the majority of our rural schools are widely separated. So we have smaller communities separated by very great distances."

Jason then indicated how they tried to solve the problem, further explaining the satellite system:

So, at the start of the CDLI saw most of the schools with a satellite system, a hybrid satellite system. There was a satellite on the roof that received incoming internet signals but the outbound signals went out through a phone line that's why I said it a hybrid [sic]. The uploading went through the phone through a dial up modem, inbound came through the faster satellite system.

Martin explained another option: “If a school didn't have good connectivity they could be sent the course on a CD or tape.” Martin explained that after a couple of meetings they decided that CDs or tapes would not work. He stated, “we had used the one way satellite connection to do it [with Legacy Model], so when CDLI came into being, connectivity was very sparse, it was basically a bunch of satellites that would only work one way.”

### **Learning to Use Technology**

Participants described their experiences regarding technological challenges in the early years of CDLI, especially in the pilot year. Jessica mentioned that learning how to use technology was a challenge. She said, “I think, even if you are more ‘techie’ you still have to learn how to use the Blackboard Collaborate (BBC) you know, the Blackboard Collaborate and D2L. You know, it's the learning process. You gotta [sic] be a good learner.” Another participant, Jacob, who worked with CDLI in the pilot year, expressed the same feeling. He stated, “I mean we had [some] people who couldn't use a mouse.” Then, he mentioned that CDLI provided them training, itself a big challenge. Martin reported that initial teacher training was an issue “because some of them had no background in technology. So, the problem was how did you keep the technology invisible and let them teach?” CDLI primarily focused on experience and expertise in priority subjects when hiring their E-teachers. The technical training could be acquired later.

### **Equipment and Tools**

Some participants also noted the challenge of placing proper equipment at CDLI schools during the pilot year. Jason reported that because there was no model for CDLI,



they experimented with new things such as the use of videos, capturing PowerPoint through Camtasia, and Captivate. He stated that experimenting with different tools was very challenging. One of the participants indicated that the Tutor's Edge tool was adopted in the pilot year and was very well received by teachers and students. It is currently known as Blackboard Collaborate. This participant also identified WebCT as another tool acquired in the pilot year. In terms of connectivity, Barry (2013) explained that every possible effort was made to upgrade internet connectivity, such as the availability of upgraded sites, satellite services, and additional dial-up lines for CDLI computers.

### **Visiting Pilot Schools**

A crucial aspect of the pilot year was the visits to the 10 schools that were implementing CDLI's new online courses by CDLI personnel, in particular Maurice Barry and Frank Shapleigh. Barry would work with the students, helping them with any issues or problems they were encountering with the new way of learning. He was also "picking their brains...finding out what was working and what was not" (Barry, 2013). Shapleigh would work on the onsite equipment and engage in onsite technical training for E-teachers and other staff. The value of these onsite visits cannot be overestimated.

In addition to the information and insight gained from the onsite visits, other sources of information and understanding were utilized during that pilot year. Barry (2013) noted these sources:

- Constant feedback from the pilot teachers.
- The start of a multi-year investigation by two researchers at Memorial University: Dr. Ken Stevens and Dr. George Coffin.

- Meetings with district-based CDLI implementation teams.
- Focus groups consisting of principals at the pilot schools and with m-teachers (onsite mediating teachers who supported the e-learning efforts).

Valuable data were obtained from these activities, data that were used to inform future decision-making and the development of the CDLI program. Barry (2013) noted that the CDLI team learned “some valuable lessons and, more importantly, made some systemic changes” in preparation for the first full year of implementation, 2002-2003. These lessons included:

- Get the internet connectivity up to scratch. A slow or unreliable line will not work. The connection needs to have enough bandwidth and not suffer from down-time.
- Provide a scheduling system that offers enough choice so that schools can integrate the distance education classes with the face-to-face classes the students are also taking.
- Provide an easy-to-use registration system.
- Pay close attention to ensuring that new students are adequately oriented.
- Provide the necessary equipment and standardize it. We wound up, in the end, supplying the PCs, the all-in-one printer/scanners used for returning student work, headset/microphones for the synchronous classes and, where necessary, graphics tablets so student could write on the whiteboards too.
- Provide a help desk that is available throughout the school day.

- Do a better job of communicating (evaluation, class routines, technical routines, registration and reporting, for example) with our various publics.

### **School Based Support: From M-Teacher to M-Team**

*Supporting Learning* also proposed the use of a mediating teacher. The report stated: “It is proposed that teachers within the schools be given direct responsibility for facilitating distance education courses, including liaison with the E-teacher and attending to matters of attendance, discipline, homework, assignments, and other normal aspects of classroom life” (Sparkes & Williams, 2000, p. 76).

Barry (2013) indicated that one teacher (an m-teacher) was appointed at each of the CDLI schools for the pilot year. The main responsibility of the m-teacher was to provide basic support to CDLI students including tests supervision and monitoring. In terms of m-teams training, Martin commented:

I participated in quite a bit of training for them, and myself, Bob Hipditch, and a number of teachers would be on the road, continuously during the Fall, for example, and then we would set up in a board office at the school, sometimes the hotel, and we would bring teachers in and we would, I guess, explain to them what CDLI was, what their role was, how we worked.

With the pilot year experiment, CDLI administration discovered that there were too many responsibilities for an m-teacher to perform. Barry (2013) reported that after the pilot year they came up with the idea of an m-team. According to Barry, an m-team was comprised of four components, elaborating each:

1. Administration: Typically done by the principal or designate. This consisted roughly of registering and selecting students and ensuring that they had an adequate, supervised space.
2. Coaching: Typically done by an onsite teacher. This consisted of student supervision and liaising with the E-teachers as needed.
3. Peer Support: Typically done by a more senior fellow student. This included aspects of coaching as well as basic training.
4. Technical: Typically done by the district technicians with help from onsite student tutors.

Barbour and Mulcahy (2009) defined the responsibilities of the m-teachers or m-team. They stated, “This includes proctoring tests and exams, monitoring student attendance and behavior, and providing general support in gaining the independent learning and self-motivation skills that may be needed to succeed in the CDLI environment.”

Study participant Jason reported that at the end of the pilot year, CDLI held several focus groups. During one of those sessions, one school principal stated that he had distributed the responsibilities among his staff. It was then that the CDLI administration formed the idea of an m-team. Jason also explained, “In smaller schools, the phrase m-team is always used, but there are schools where the m-team is just one person.” When I inquired about the compensation for an m-team, participants stated that m-teachers or m-teams did not receive any financial incentives. Jack pointed out that they tried to

encourage m-teams and provided substitute teacher time for training, which was an opportunity for them to travel and meet their peers.

### **Two Time Zones Issue**

During the pilot year the CDLI team encountered a number of challenges that needed resolution. One of these was the two time zone issue. The province of Newfoundland and Labrador has two time zones. One of the participants explained, “Northern Labrador uses the Atlantic time zone [UTC-4 hours], but the rest of the province [southern Labrador and the Island of Newfoundland] uses Newfoundland time [UTC-3.5 hours].” The two time zones presented a challenge for synchronous classes and interactions. Jacob clarified, “The number of students from Labrador is small for some courses—not large enough to make up a single class—so some classes had to have students from both time zones. This was problematic because we couldn’t just dictate that the Labrador schools change their opening and closing times.” Luckily, after this problem was realized the CDLI administration found a solution. Jason described how the issue was resolved:

In the classes that combined students from both time zones, I was careful not to schedule the instructor in a face-to-face period just before or after that class. This allowed the class to run 1.5 hours instead of the 1 hour norm. So, what happened was that the Labrador students joined first and were there with the instructor for 30 minutes. After that 30 minutes, they were joined by the rest of the students. Half an hour later the Labrador students finished. The class therefore was: (a) 30 minutes

tutorial for the Labrador group (b) whole class instruction (c) 30

minutes tutorial for the remaining group.

Another participant, Jacob, added that if there were enough kids from Labrador then they would give them their own separate time slots. He stated, “So if I could get even eight or 10 Labrador kids I would start them completely separate.”

### **Conclusion**

After the pilot year, CDLI moved from an m-teacher to an m-team. Also, CDLI solved the problem of teaching in two time zones. What was accomplished during that pilot year was “...by no means easy. Those of us on the supporting end of the project burned the candle at both ends to make it work” (Barry, 2013). By going against the recommendations of the Ministerial Panel and deciding to have a pilot year, CDLI had the opportunity to make necessary changes during that first year without the pressures of a complete transfer to the new model. That, as it turned out, was a very good thing. By going with a pilot, the school system had the chance to see how the new model held up against the Legacy Model. It not only held up but, as the pilot year progressed and necessary changes were made, it became clear that the new model was significantly better.

### **Growth and Development**

The purpose of this section is to describe the growth and development of CDLI in terms of course offerings, student enrolment, teachers, and schools. At the end of this section, I will describe the current organization of CDLI and the evolution of its technology.

After the pilot year, CDLI grew exponentially. Barry (2013) reported that in the subsequent year, CDLI became a division of the Department of Education. He further reported that CDLI became the first provincial virtual school. According to Barry, additional E-teachers were hired in 2002. CDLI grew very fast in its first few years. One of the participants described the growth of CDLI, mentioning that in the first year after the 2002-2003 implementation year CDLI offered 11 additional courses by 19 instructors to approximately 1000 students from 73 small schools. He further explained that in 2003-2004, CDLI offered 25 courses by 23.5 instructors to approximately 1400 registrants from 95 small schools. In 2004-2005, course registration reached 1600 students and 30 courses were offered in 97 small schools. Barry (2013) made a very interesting point: “By 2004 we had 30 full courses developed. While the material was prepared primarily for the distance education students we also copied the full content over to our main website and made it available to all students and teachers in the province.” This meant that all students, whether they were CDLI students or not, had access via the Internet to a rich source of curriculum materials that had been created for distance students.

As years went by, the growth of CDLI became more evident. For example, in the school year 2005-2006, CDLI offered 33 courses to students from 107 schools. The number of registered students in that year was 1385. During the school year 2012-2013, CDLI offered 40 courses to students from 109 schools. CDLI also hired more E-teachers. During the 2006-2007 school year, 30 E-teachers were part of CDLI. Similarly, during the 2012-2013 school year, 35 teachers served CDLI students across the province.

### **Equipment Distribution**

CDLI provided, free of cost, all the equipment that was needed for its courses. One participant praised CDLI, “They pay for everything. They are awesome and it's so impressive.” Barry (2013) reported that in the early years, CDLI provided to its schools all the necessary equipment such as printers and scanners; all the networking equipment; headset-microphones (one for each student); and special purpose equipment such as sensors for collecting laboratory data. He further commented, “We continue to do this today and as our course range has broadened so, too, has the equipment.” One administrator, Tom, pointed to recent changes due to the equipment budget, reporting, “We're buying less equipment because of our budget.” He further explained, however, that CDLI had policies and procedures in place regarding the distribution of equipment. He reported that the administration made sure that no school was over-supplied or under-supplied.

### **Student Selection**

The selection of students for enrolment in CDLI courses is the responsibility of the schools. Tom explained that students are not selected by CDLI. He commented, “We work with schools. The school and principals identify students who want courses from us.” He further reported that they never said “no” to any student. Jack commented, “...so that selection is always left to the school and they decide who is going to do what courses based on the ability, based on their staff complement, and based on their needs.” Another participant, Jason, commented,



It is totally the students' choice. But the principals may intervene, you know, totally without CDLI knowledge or blessing. The principal might say, "Well, I don't think that you could handle that course or a CDLI course, I am putting you into Biology." That may be happening. But it is not with CDLI's understanding. CDLI simply puts out the registration system.

In the beginning, students were selected for CDLI courses by the principals of the schools. They only chose those students they believed had the necessary attributes to work in an online environment with minimum supervision. More recently, due to consolidation and closure, as well as a shortage of teachers, students with an increasing range of ability have to take CDLI courses if they are interested in pursuing post-secondary education.

### **School-Based Issues**

From the data analysis I discovered that CDLI had ongoing school-based issues, including lack of student supervision, student discipline, availability of proper physical space, and connectivity issues in some schools.

**Student use of offline time.** A significant school-based issue was the unproductive use of asynchronous time by some CDLI students. Most of the participants in the study mentioned that on-site support was critical. Jack stated, "We saw that there were occasions where the students weren't using that offline time wisely or schools had started scheduling one-credit courses in that five-period time." Some students were either

on Facebook or playing games on their cell phones. The lack of supervision at schools contributed to the issue.

**Demands on school-based teachers.** Another issue was the many demands on school-based teachers, probably more than schools and CDLI might have anticipated. It was an advantage to have somebody in the school that students could go to if they had problems with online classes, but school-based teachers were not recognized for the time they spent helping CDLI students.

**Dealing with different principals.** Dealing with different principals from various schools was another ongoing administrative challenge identified by the participants. One of the administrators explained that some principals did not tell them the exact number of prospective CDLI students. Once they appointed the teachers and class started, CDLI would not find that same number of students. Jacob stated, “there was one school in particular three years in a row, they were just sending in [sic], they wanted like five courses done in CDLI and they quoted ‘7, 7, 7, 7, 7.’ And when the actual number came in they might be 0, 0, 0, 0, 2.” Jacob did say that most of the principals were good. However, a small number of principals gave him a “hard time” about 10% of the time. But each year he hoped that the next year they would do better.

**Student discipline issues.** Participants also expressed their views regarding student discipline issues. One of the administrators mentioned that because all CDLI students were also part of a traditional school in their communities, in most cases the discipline problems were dealt with at the local level. However, CDLI teachers did deal

with such issues. Jack stated, “The way CDLI structures things is we allow our teachers a lot of autonomy to interact with schools and the staff that they have at schools to deal with the issues and problems.” He also reported that the E-teachers and the local schools involved him when there was a very serious issue.

**A space to learn.** In terms of physical space at local schools, the participants reported that each school provided space for CDLI students. From document analysis, it appeared that the physical space for CDLI at schools varied from school to school. Barbour (2007) reported, “In some schools the CDLI computers are placed in the back of a face-to-face teacher’s classroom. This allows for the students to be under direct supervision while they are engaged in their online learning.” He also explained that some schools had separate space for online learners, especially those schools that had a history of distance education.

### **Current Organization of CDLI**

CDLI is a division of the provincial Department of Education and Early Childhood Development. Jim Tuff is the present director of CDLI. He is responsible for the overall operation of CDLI and signs off on all major decisions and also manages the budgeting process. Tuff oversees the division and has direct contact with students. His colleagues at the Department of Education, however, have direct contact with the school districts and administration, not with the students. One of the study’s participants reported that the director’s office was located at West Block in the Confederation Building. In contrast, all other staff and teachers work from schools, school district offices, College of

North Atlantic, and other provincially funded post-secondary institutions. In terms of recent management and teaching staff at CDLI, participant Tom stated, “We had approximately 38 to 40 employees at CDLI in 2005, and then we grew over time to a high point of 52. We are back down to 46. So, we had some ups and downs over the years.” CDLI’s (2014) website clearly indicates:

CDLI has forty-six staff including a director, two program development specialists, two training specialists, a connectivity and communications specialist, an IT systems manager, twenty-nine E-teachers, a guidance counsellor, and nine administration and support staff. The staff members are located in seventeen office locations that span the entire province.

Mike Sceviour is the e-principal and program development specialist and supervises all E-teachers and the guidance counsellor. The e-principal also interacts with up to 115 schools as a co-principal. Frank Shapleigh is the coordinator of communication and connectivity.

### **Evolution of Technology**

Technology evolved over time in the CDLI environment. Various software and tools were used to deliver online and offline instructions to CDLI students. If CDLI administration found any issue with a tool or software and there was a better option found, they certainly went for the better option. Barry (2013) reported that before the establishment of CDLI, in 1998, NetMeeting software was used for synchronous classes in the Legacy Model. He pointed out that there were some issues with NetMeeting. Therefore, they tried MeetingPoint software for the synchronous classes. For the

asynchronous classes, WebCT was used. Barry explained that MeetingPoint also had some issues. Therefore, they looked for more reliable software. Eventually, CDLI bought the Tutor's Edge software. Barry further explained that as well as two-way audio and whiteboarding capability, the software had “new features: messaging, polling, permissions and—within a year—application sharing.” One year later, the product was renamed VClass and then again rebranded as Elluminate Live! Barry explained that Blackboard Collaborate (BBC) was the latest version of Elluminate Live!

CDLI also used software for recording classes and short clips. Barry (2013) mentioned that in the early years of CDLI, software called Camtasia was used for recordings. He commented that “The synchronous classes can be recorded. The recording includes all the audio and whiteboards and all the interactions.” Barry reported that in 2003 CDLI had prepared approximately 650 short recorded tutorials for eight courses. They called those five- to-ten minute clips Multimedia Learning Objects (MLOs). Jason commented, “YouTube came along in 2005. Khan Academy came along in 2004. And I am happy to say that we started doing these in 2002. Before Khan even thought about it we invented it.” According to Barry, CDLI later used software called Captivate to create MLOs. He described two main benefits of Captivate: (a) “Captivate allowed for the direct import of PowerPoints and (b) Captivate itself had text and basic drawing tools; enough so that the slides could be constructed from within the software. This meant that if errors were found they could be fixed directly; no tedious re-recording required.”

Barry also reported that CDLI extensively used video conferencing tools. He explained “A videoconference unit that is 3 + 1 enabled is capable of connecting to three

other units. In such an arrangement the users see all four locations arranged ‘Hollywood squares’ style.” He further pointed out that CDLI purchased a video conferencing bridge, stating that “This was a device whose purpose was to combine multiple sites so that the users’ own equipment did not have to do it.” According to Barry, CDLI could run 32 sites. So, a large class could be run with 32 sites. In terms of a learning management system (LMS), William reported that they used Desire to Learn (D2L) as an LMS. Tom stated:

We use the learning management system, Desire2Learn, as our current tool, that organizes our class shells, organizes our learning content, and organizes our classroom structure. We use synchronous learning through Blackboard Collaborate. So that’s our virtual classroom which enables our teachers and students to get together synchronously.

CDLI teachers and employees were consistently engaged in exploring and experimenting with new software and tools. One E-teacher, William, reported that he not only used new technology, but also explored new technologies for teaching and learning, such as Audacity. Alex described that he used MLOs and YouTube clips for his courses. Nathan reported that he used (a) Polycom, (b) BBC, (c) PowerPoint presentations, (d) overhead projectors, (e) Adobe Captivate, (f) Photoshop, and (g) Corel Draw.

In terms of connectivity, most of the participants expressed the common view that it was still a major issue at some schools. Martin explained that the servers for D2L were at Memorial University, but the server for Blackboard Collaborate had shifted to Alberta. He commented, “We still have satellites in a number of schools and the problem with

satellites is latency, it takes seven hundred milliseconds for a signal to go from the school to MUN and then another seven hundred to go back again, as compared to a hundred for frame relay or if you're on fiber it might be 10.” Martin explained that in 2007, most of the schools in rural Newfoundland and Labrador were connected with FiberOptic under the project of Connecting Learners and Communities. The federal government, the provincial government, and two private companies—Alliant and Eastlink—provided funding for the project. As a result, 99 communities got Internet.

Martin reported that, in the early days when they delivered equipment to schools, they provided training to students and school teachers to use the equipment. He stated, “I act as a support for them [students and teachers], we visit schools, we drop off equipment, we train kids on how to use it and so on.” I also learned that CDLI developed additional multimedia learning clips. Barbour (2007) stated, “The CDLI has also developed a series of 50 to 100 multimedia learning clips per course, for 11 courses that are evaluated with year-end standardized public examinations.” In terms of recorded classes, the participants viewed it as one of the major benefits for CDLI students. Daniel stated:

So we can actually export our recorded classes to mp4, which is video and audio.

And that can be downloaded at school if the person going on a trip, maybe they gonna miss couple of classes [sic]. So they can either get some of them

downloaded and put in a Google Drive somewhere, they can access on the road.

So if they have trouble signing in or can't sign in or don't want to they can always access the unplugged recordings.

### **E-teachers**

The International Association for K-12 Online Learning (iNACOL) is a non-profit organization that has been working to transform K-12 blended and online learning. iNACOL presented comprehensive definitions of terms that are commonly used in an online learning environment. The report *The Online Learning Definitions Project* was published in 2011. iNACOL (2011) defined an E-teacher as “The person who holds the appropriate teaching certification and is responsible for instruction in an online course” (p. 8).

The government document *Supporting Learning* envisioned roles, responsibilities and expectations for an E-teacher. According to Sparkes and Williams (2000), an E-teacher would be a long distance teacher and a course manager who would be responsible for course delivery and regular communication with students and with their school-based teachers. The regular communication included communication outside regular hours such as responding to emails, receiving and responding on phone calls, and participating in conference forums. The course delivery responsibilities included online teaching, marking assignments and exams, and keeping the online courses up to date. Along with course delivery and regular communication, the professional development activities for other teachers would also be a responsibility of E-teachers. Further, E-teachers would be assigned work on a full-time basis with one to two courses and these E-teachers would be free from the supervisory function of a traditional teacher. Sparkes and Williams suggested that “E-teaching should not, in general, be combined with regular classroom teaching, because this would reduce flexibility” (p. 75).



Regarding the location of E-teachers, the document *Supporting Learning* considered both arguments: centralization and decentralization. In terms of centralization, *Supporting Learning* presented the argument that E-teachers could easily avail of the opportunities of using centralized computer facilities, technical staff, and communications systems. *Supporting Learning* also presented an argument that favored decentralization. According to Sparkes and Williams (2000), “Decentralization would obviate the need for teachers to relocate and reduce the demand for a central facility to house these teachers.” Eventually, the decision was left to CDLI for detailed planning. Later, E-teachers were appointed at different locations.

### **E-teacher Characteristics**

The study’s participants described a wide range of preferred E-teacher characteristics, such as (a) subject expertise, (b) empathy, (c) strong interpersonal skills, (d) innovativeness, (e) a good learner, (f) patience, (g) passion, (h) organizational, and (i) technology literate. Laura commented, “First of all, the E-teachers have to be qualified in their subject areas.” She also mentioned that an E-teacher needed to be patient. Jessica viewed empathy and strong interpersonal skills as significant for e-teaching. Jacob reported that teaching from a distance was a challenging job and viewed finding new ways to engage learners an important characteristic of an E-teacher. Alex pointed out two qualities of a good E-teacher: (a) working with technology and (b) communicating with kids from distance. Jack stated, “The preferred characteristics of E-teachers are that they’re able to teach, they want to learn, they’re flexible. It is always beneficial that they’re organized and they’ve some technology flair.” Daniel also viewed (a) empathy and (b) subject matter expertise as two significant characteristics of an E-teacher.

When I asked the participants about their role as E-teachers, most of the participants viewed their role as very challenging and described some of the challenges of their job.

### **Participants' Views on E-teaching: A Challenging Job**

Participants identified a variety of challenges encountered by E-teachers. They indicated that E-teachers had to deal with technological issues, curriculum issues, different time zone issues, and school issues such as scheduling and graduation. Alex stated:

So there is [sic] always challenges that come up. We have, you know, something as simple as graduation. It is a challenge for us because in a regular school, you have one graduation, you will lose one day but for us every school that we teach has a [different] graduation day. So we are always losing kids, for a day here and a day there for different reasons.

Alex also pointed out other logistical issues such as Professional Development (PD) days and school schedules. He explained that each school had different PD days. Another participant echoed Alex's challenge. He reported that e-teaching was a challenge because you had to teach students from different schools with different schedules. He stated, "So some school starts at 10 minutes later than the others. Some of them, they have a half hour lunch instead of an hour lunch. Some schools close at 2:30 and some at 3:00."

Therefore, in all these situations, the real challenge was how to get all the students on the same schedule.

One of the participants mentioned that teaching from a distance was a challenge “because you cannot see your students.” He clarified that because an E-teacher did not see his or her students “an E-teacher could not see the body language of his or her students and couldn't see what they were doing.”

In terms of science labs and on-site supervision, Alex identified doing labs at a distance as another challenge. He explained that it was difficult to make sure that all schools had equipment and that someone was there to supervise the students. Laura spoke about the lack of onsite supervision at some sites.

CDLI teachers teach students from different schools. Therefore, one of the participants, Emily, indicated that dealing with parents, guardians, and school administrators from these different schools is often a challenge. She stated:

You have parents who'll call you. You'll have administrators who will call [on behalf of parents]. I think the biggest thing that you can do is sit down and listen to them and then give them time to cool down so you can call back and say, “Okay, this is the perspective I'm taking. I'm trying to help my best or do whatever to ensure that your child or your student succeeds. This is what I've tried, what have you tried? Is there any information you can give me that will help to improve this, you know, the academic standings of your child, you've known this particular student or child for how many years, I've only known them this year.”

Emily indicated that e-teaching itself was also a challenge because there were some schools that did not embrace e-learning. She stated, “...the major issues that we got [sic], like schools that don't embrace the e-learning. They often have in-school staff that

are not supportive. They think of us as outsiders taking their jobs, rather than staff members.”

**Student-teacher separation.** In traditional schools, teachers and students interact with each other face-to-face. In the CDLI online environment, students and teachers are located at different places. Some of the participants reported that student teacher separation was a teaching challenge. Jacob reported that they had hired master teachers with experience of teaching in the face-to-face classroom. He further explained that the teachers were asked to do the same thing without seeing their students, and that was the main challenge. The teachers were asked to use the techniques, strategies, and skills that they had used in their face-to-face classrooms. William reported in his own words, “One of the biggest challenges in teaching online is the [physical] separation of the student and the teacher because we are not face-to-face, so that challenge has always been there.” Laura identified a solution to this problem: “We use technology to try to minimize that [physical separation]. I try to use things like video conferencing. Video conferencing tools and those sources of technology allow me to connect with students one-on-one, to develop rapport with students.” Laura also noted that they made frequent telephone calls in order to build rapport with the online learners.

William pointed out that another challenge was students who had little background in their subject area. He stated, “I am a music teacher, so some of my students when they come to my class for the first time they may have very little music exposure, they may have very little music education.” Then, he outlined a solution. He

stated, “I try to get a lot of personal one-on-one time with each student so that I can address every individual's concerns, all the students' individual needs.”

Some participants also reported that travel to schools was an issue because of the geographical distance between communities, especially for lab support and the training of specialist personnel.

**Student lost instructional time.** Many participants in this study identified students' lost instructional time as one of the teaching challenges. Jacob reported, “One of the biggest problems was that lost time.” He explained that in a CDLI class students could be from 12 different schools. He recognized some possible reasons for that lost time, “because during the winter it could be a storm, could be [a] water problem, electrical problem, anything, sickness, flu, so any one time you might get 80, 70 % of your class.” Another participant, Alex, stated, “PD days is [sic] a challenge. Because, you know, every single school doing three- to-five PD days a year, something are [sic] coming at random for the variety of schools. So kids are always missing time.” Jacob pointed out that one solution to this lost time was the introduction of recorded classes.

**Students not working during asynchronous periods.** The participants also indicated the issue of student offline time. For example, Jacob mentioned that in the early days of CDLI there were limited licences for synchronous classes. Therefore, he had to give each teacher five synchronous and five asynchronous classes or six and four, or seven and three. He further mentioned that during the asynchronous time, “The kids weren't doing what they were supposed to be doing, right? They were not doing [their work].” Jacob pointed out that he requested schools to provide a person to supervise the

students during asynchronous time. He explained how they coped with the challenge by modelling the face-to-face classes through online teaching: “I said that doesn't mean you [sic] going to be teaching 10 periods online. I said you [sic] going to be there and you might say to kids, ‘Okay kids, take 20 minutes and work on your stuff,’ while you are still there in that online environment.” Since 2005, CDLI has had more licences for synchronous classes. Now, every teacher can go online whenever they want to. Jason stated the current situation in his own words:

What you would see is the students would all gather together for the start of the class. The teacher would review the previous day's work and would outline the work for the day. And then the teacher would give the students their work for the day but would keep the line opened. Just like the teacher would cover from student-to-student in the regular classroom, the teacher keeps the line opened if any student has any question, simply turns on the mic and ask[s] the question or text[s] the teacher.

Even though the improvement with more synchronous licences was apparent, participants still demonstrated the need for students to be supervised so that they could use their offline time wisely.

### **E-teacher Recruitment**

For the pilot year, the director of CDLI requested each English school district to provide a teacher. Therefore, teachers were chosen by CDLI for the pilot year and the district provided those teachers to CDLI. After the pilot year, CDLI management hired E-

teachers. A participant who held an administrative position with CDLI described his experience of hiring E-teachers. He reported that he examined the student enrolment first. Then, he planned to hire E-teachers accordingly. He reported that he used to hire E-teachers in April and May, explaining that if they hired E-teachers in May the school districts would have enough time to fill their vacant positions for September because all the teachers were hired from traditional schools. He said that when he advertised a position, he would get 100 to 200 applications. That's why "someone said to me at one time that we are cherry picking, we were taking the best teachers in [sic] the Island and bringing them into CDLI." He gave one example of a hiring position during this period:

I remember once we had an English position. We advertised for one English position and I remember I had 150 department heads of English from the biggest schools across the province apply, 40 had a Master's degree in English. We had to narrow it down to five. I ended up with seven. I couldn't go any lower, we interviewed seven.

Jacob described the reasons for the popularity of working with CDLI. He said that teachers were interested in working with CDLI because the teachers wanted change and challenge. There were there components to the hiring process, he explained.

1. The online application. Applicants had to answer questions as to why they wanted to be an E-teacher. They had to be consistent and describe their background.
2. The interview. Each interview took place for an hour and a half with a panel of three CDLI personnel.

### 3. The reference check.

The hiring process of E-teachers changed over time. One administrator, Tom, described the current hiring process. According to Tom, CDLI recruited E-teachers based on need. He observed, “We go through a hiring process. We post a position, provide details of the position, and go through a hiring process, reference check process, and then, finally, an appointment process.” Nowadays, Jack pointed out, CDLI does not recruit E-teachers directly. E-teachers are hired through the public hiring website of the Government of Newfoundland and Labrador. He commented, “Myself and my director are involved with recruitment, but the Public Service is the one that directs it and controls it and takes care of it for us.” Since CDLI hires teachers with experience, most of the candidates are regular teachers in the school districts. Jack reported that once a teacher was hired, CDLI went to the school district and requested secondment of the teacher. If the school district refused, CDLI went to the next person on the list.

### **Teacher Training, Professional Development (PD) and Teacher Evaluation**

CDLI provides training to E-teachers through orientation and mentorship. One of the administrators explained that all teachers were hired from the school districts. Therefore, they were experienced teachers. He further explained that E-teachers needed to learn online teaching, training that was provided in a week-long session during the summer. One of the participants, Tom, described teacher training: “We would hire teachers early enough in the summertime. We will bring them in a couple of days before the school years started and get all the orientation underway.”



Tom identified mentorship as one of the main components of E-teachers training with CDLI. He stated, “We have a lot of mentorship training. Every new teacher we hire is paired with a mentor, usually in the same subject area of teaching, the same in the group where possible, and that teacher will work with a new teacher.” Emily further reported that the pod leaders (heads) in CDLI also provided professional development training within their subject areas. Jason reported that CDLI had two training specialists. Despite all these efforts, Tom wished for more pre-service teacher training to prepare teachers for online teaching. He commented, “I think teachers have to be prepared to use these tools [technology] and how do you engage students at distance, how do you engage through online tools, how do you use the media and multimedia resources?”

Professional development is an integral part of CDLI. CDLI provides professional development through face-to-face meetings and through online sessions. In the past, CDLI had three face-to-face meetings for professional development. Then, a couple of years ago, CDLI reduced it two face-to-face meetings, and this year CDLI had only one face-to-face meeting. Jacob described the schedule: “We had a meeting at the beginning of the year, one meeting at the middle of the year after exams were over, and we had a meeting at the end of the year.” These meetings were held for all the CDLI teachers and staff. Regarding the last year, Alex reported that in addition to two yearly meetings, CDLI also provided online professional development. “We also have online professional development throughout the year. We have Skype sessions.” As well as CDLI professional development, many teachers reported that they took care of their own professional development. They look for related material on the Internet; they connect

with their colleagues from around the province or the country. For example, William stated, “I do a lot of professional development myself. So, I always do a lot of reading journals, things like that, or find out what is the latest trends [sic] or things like that.”

All CDLI teachers are tenured. CDLI teachers carry out peer evaluation and performance appraisals. When I asked about E-teachers’ evaluation, one of the administrators reported that he used to have an online portfolio. Jacob explained that in the beginning he used to sit in on his teachers’ online classes for two- to-three times a year. Later, he stopped sitting in on those online classes. Another participant, Tom, reported that most of his teachers had already passed evaluation before joining CDLI because they were tenured with their school districts. Jack stated, “We have ongoing peer evaluation that we do, and we also do performance appraisals where necessary.” He explained that peer evaluation was done through direct observation of E-teachers’ classes or recordings of their classes.

### **E-teachers' Qualifications**

Interview data revealed E-teachers’ education. From interview transcripts, I found that most of the E-teachers were highly qualified. For example, William had a Bachelor of Music, Bachelor of Music Education, and a Master of Education. He also had online teaching experience before joining CDLI, but he gained that online teaching experience through teaching in the private sector.

Jessica had a bachelor's degree in Physical Education, a bachelor's degree in Education, and a Master of Education. She had 29 years teaching experience and 23 years' experience in Guidance.

Jacob had a Bachelor of Science and a Master of Math Education. He had worked for CDLI approximately eight years.

Emily had a Bachelor of Science, a Bachelor of Education and a Master of Education. She had been with CDLI for eight years.

Tom had a Bachelor of Music, a Bachelor of Music Education, a Diploma in Technology and a Master of Education. He had been with CDLI for one year.

Jack had a Bachelor of Science, a Bachelor of Education and a Master of Education. He had been working with CDLI for 12 years.

Emma had a Bachelor of Arts, a Bachelor of Education and a Master of Education. She had worked for CDLI for eight years.

### **Synchronous and Asynchronous**

CDLI used two methods of delivery: (a) synchronous and (b) asynchronous. Barry (2013) talked about synchronous teaching:

We built up a system that combined independent work with scheduled live classes. We called those latter ones “synchronous” because students and teachers were together, online and interacting in real time. In most regards it was similar to face-to-face (F2F)—we did have full two-way audio for everyone and a shared

electronic whiteboard.

Barbour (2007) reported:

Depending on the subject area, anywhere from 30% to 80% of the students' scheduled time (which is 10 one-hour periods over a fourteen-day cycle), [is spent] in synchronous instruction using the voice-over Internet protocol software, Elluminate Live®. This software allows for two-way voice over the Internet, a shared, interactive whiteboard, instant messaging, application sharing, breakout rooms, and interactive quiz and survey management. Through this software, teachers are able to provide synchronous instruction in much the same way that they would in a traditional classroom.

Barbour also reported that CDLI used WebCT software for asynchronous instruction. He further explained that WebCT provided students and teachers "a discussion forum, a shared calendar, an internal e-mail system, and a place to house the course web pages."

One of the participants, Jack, explained the asynchronous model: "So the teaching had to be structured in such a way that is similar to a face-to-face environment where students would receive instructions for the part of the period and then the next part of the period they will be doing some drill and practice or interaction with content."

Other participants mentioned that they not only used synchronous and asynchronous, but also viewed both modes very valuable in terms of teaching and learning. William stated, "If you are using [a] synchronous tool like video conferencing along with the asynchronous techniques of journal writing and recording and these sorts of things, this becomes very, very powerful together. So I try to use both."

### **Pedagogy**

The purpose of this section is to describe the pedagogy employed by the E-teachers working with CDLI. This section will describe what happens in a typical CDLI instructional session. In addition, the section will describe the various offline supports that supplement the online pedagogy. CDLI recruits specialist teachers to teach in their subject areas. One of the administrators, Jacob, stated, “I hired a math teacher to teach Math; I hired a chemistry teacher to teach all Chemistry.” Most of the participants expressed satisfaction with CDLI teaching. One participant, Jack, reported that CDLI had not changed much since its inception in terms of teaching. William stated, “I believe that what we do at CDLI is as good as it can be in today's technology.” He went further and stated, “I think it is equivalent to an excellent education in a face-to-face environment.” One administrator indicated that when he compared public exams results, “We do as good, or better, than what the province is doing in terms of public exams.” Laura mentioned that e-learning was a wonderful way to learn. She talked about the advantages of CDLI and said, “It opens up the worlds for our students out there around the province who do not have schools like Holy Heart [one of the largest schools in the province] where the choice is unlimited.”

### **CDLI Courses and Classes**

CDLI uses the same academic courses that are taught in all high schools in the province. Therefore, CDLI does not develop the curriculum content it uses. The curriculum is developed by the Department of Education and Early Childhood

Development. However, CDLI's instructional designers adapt the courses and make them suitable for online learning. For example, in the pilot year the instructional developers were seconded or contracted to prepare course templates. The developers adapted the course content and imported it into the Learning Management System (LMS) which was WebCT when CDLI began; then Desire to Learn (D2L); and today is known as Brightspace. The courses were divided into units and sub-units (sections). Each unit or section contained lessons. Each lesson could be completed in one-to- three class periods in synchronous and asynchronous classes. Barry (2013) explained that each lesson consisted of five components and those components were:

1. You Will Learn: A list of the curriculum outcomes for the lesson, but re-worded so that they would be understandable to students. Curriculum outcomes from Curriculum Guides are written for teachers and often contain jargon; the developers used language that students would be expected to understand.
2. You Should Already Know: A list of items that students were expected to know before starting the lesson. This was an effort not to re-teach content that was expected to be previously taught. Mostly, this section listed the items and, perhaps, linked back to the lessons where they would have been addressed, if appropriate.
3. Lesson: The actual learning content. Typically, this consisted of text and graphics. In Grade 11 Physics, for example, the developer included objects created using Macromedia® Flash™ as well as the text.

4. Activities: As the name suggests, these would include additional items that students would do. In the grade 11 physics course, for example, these tended to include practice questions and problems.
5. Test Yourself: A short self-assessment. In many of the courses, including Physics, this would be an interactive multiple choice quiz powered by an open-source JavaScript engine that developers had come across.

Today, CDLI has a curriculum development team led by Eric Nippard. A web developer and an instructional designer also work with Nippard. The curriculum development team modifies the provincial curriculum for the online learning environment.

CDLI uses 10 periods per 14-day cycle for a two-credit course. This is the same format used in the province's face-to-face schools. As noted above, CDLI uses synchronous and asynchronous delivery methods. In the past, depending on the subjects, CDLI used a split of synchronous and asynchronous classes. For example, in Core French, 3 out of 10 of the periods would be asynchronous. Today, it has changed. According to one of the participants, "We gave our teachers the flexibility to have all 10 periods at their disposal." Therefore, it is up to the E-teachers to decide about their teaching methods and how many synchronous and how many asynchronous classes they want to use in the 10 periods per 14-day cycle. Whatever courses are not offered at the local high schools, students can take through CDLI since CDLI serves as a supplement to provincial high school courses. There is no set course limit for students to take of CDLI courses. However, most of the students take one or two courses.

CDLI online classes start like classes in any other brick-and-mortar school in the province. The first class starts at 8:50 a.m. Then, there is a second class from 9:50 to 10:50. At 11:05, students have their third class. From 1:00 p.m. to 2:00 p.m., students take their fourth class. The last class runs from 2:00 p.m. to 3:00 p.m. Depending on what courses students are taking, they might have one class at 9:50 a.m. and the second class at 2:00 p.m. The students take their CDLI courses according to their set schedule. In addition to CDLI courses, the students study courses that are available at their local schools.

As indicated earlier, CDLI courses have synchronous and asynchronous classes. In a typical synchronous class, for the first class at 8:50 a.m., the E-teachers log in the online class through the LMS 30 to 60 minutes before the class starts. They check their emails and do administrative work such as uploading any test or exam needed for the day's class. The students log in at 8:45 a.m. Each student has a username and a password. After they log in, they click on the "Go to Desire2Learn" link. The D2L page opens. Then, they select their course from the course drop-down list. They select Blackboard Collaborate (BBC). Then, students select the slot for their course. The class runs similar to the face-to-face class. For the first five- to-ten minutes, the E-teacher spends having a light chat with the students.

Many of the participants mentioned that they spent five- to-ten minutes in rapport building during the first online session at the beginning of a semester. They were interested in getting to know the students, their routines, their hobbies, and how they spent their days. How the lesson starts depends on the topic of the course. One of the



participants stated in his words, “It is five- to-ten [minutes] social, 20- to-30 talk, 20- to-30 work, [then move on] reconciliation, move on.” For example, in a typical mathematics class, after the first few minutes of socializing, a math teacher teaches application sharing in a problem and he wants to capture a real life example. The teacher teaches the concept for approximately 20 minutes. Then, he stops and asks the students to practice the concept for five- to-ten minutes. Some of the teachers provide instructions and ask students to do class work on the topic. The teacher tells the students that he or she is there if they need any help. One of the plus points of synchronous classes is that the classes are recorded, and the students have easy access to them later. The recorded classes are useful for students to review the material or make up their missed classes.

In terms of asynchronous classes, those classes are used to conduct exams, to do online assignments, and to practice concepts. In a typical asynchronous class, the students work offline but are aware that their teacher is there if they have any questions. The teacher is available online but the students work on their own. If they have any questions they can text or call the E-teacher, who responds immediately. At their brick-and-mortar schools, CDLI students are supposed to be supervised by school-based personnel including m-teachers to make sure that they are working on the assigned work while offline. The E-teacher logs into the LMS and does administrative work, but he or she is there to help the students. If a student has any questions, he or she can log in and ask questions. The E-teacher is already there to respond to the questions.

### **Teaching Strategies & Teacher’s Role**

CDLI teachers use many strategies to teach e-learners. Jacob mentioned that he was amazed to see that his E-teachers used a variety of strategies. He identified that E-

teachers were using different strategies for the beginning, middle, and close of class. He stated, "These people are using all kinds of different strategies." Other participants also indicated that they used a wide range of strategies to teach. Alex said that he used icebreaker activities at the beginning of his lessons. He stated, "From the beginning [of a course], you try to get the kids to know you, you introduce yourself to them, you get them to introduce themselves to the class through chat and audio communications." Daniel indicated that when he opened his online class, for the first couple of minutes of each class, he talked about the weather forecast, ice fishing, ice hockey, winter games and hunting. Emily stated, "When I'm teaching, I give out as many examples and sample problems." Another participant, William, viewed the frequent use of video conferencing useful to engage students. He stated, "Video-conferencing techniques allow me to basically conduct a music class [the] same as I would have actually sitting in the same room with the student." He explained that he used strategies based on the personal needs of the students. He also reported that he worked with students to set deadlines and set goals for themselves and, then, he made sure that students followed them.

CDLI teachers use a variety of tools to engage learners. Alex reported that as well as regular teaching, he also shared YouTube videos, web links, and multimedia learning objects (MLOs) related to his subjects. He also emphasised the importance of being organized. He stated, "Making sure that things are available on the home page there and organized and [sic] such a way that it is easy [to] access so that they can quickly find things...."

In terms of their roles, E-teachers reported that they performed multiple roles including web facilitator, mentor, and technical support person. Daniel stated:

I will keep my learning management system up to date, I use discussion forums, and, you know, drop boxes, that sort of things [sic]. I will show my students how to access that. I would discuss with the parents what the students would see and what they would see because they have an account as well. So, that's what a web facilitator is supposed to do.

### **Student Assessment**

CDLI teachers use many types of assessment. Jack stated, “We use a multimodal approach to assessment. You know, we use quizzes, tests, you know, standardized in some cases and what I mean by standardized [is] they could be common assessment from the districts or the public exam.” He explained that, “By and large, assessment is varied. We use projects, we use feedback, portfolios, you know, as part of that.” From the interview transcripts, I also found that the types of assessment vary from teacher to teacher depending on their areas of teaching. For example, with a music teacher the student assessment might be comprised of a live performance, an essay, a composition, or something very simple. Another participant, Alex, reported that for student assessment he had online assignments, short answer questions, homework questions, and lab work. Emma identified that she had summative assessments and formative assessments. She stated, “The summative assessment was the whole range from public exams down to school based, summative assessment midyear exams that kinds of things, unit testing with more and more project-based formative assessment leading up to that.” She elaborated that she focused on “project-based assessment, digital portfolios, and assessment that focused on the four skills of language learning.”

**Lab work**

In terms of lab work, all the participants agreed that lab work was a very important piece of the curriculum. James reported that doing labs through CDLI was a challenging task since small rural schools didn't have labs like their urban counterparts. Tom reported that, in the early days, CDLI used to have two full-time science lab teachers who would teach science labs. He commented, "In many cases they went to the schools. So, they drove to the school, physically drove. After [the] first couple of experiences we [CDLI administration] decided, we added big boxes, trunks they carry with them." He further explained that those teachers would do the labs in traditional schools with students. Due to budget cuts, CDLI was then reduced to one lab support teacher. Emily reported that the lab support teacher also had to teach courses such as Biology and Earth Systems. Therefore, the lab support teacher used a lot of online sessions by using Skype and Blackboard Collaborate (BBC).

Alex mentioned that some labs would require supervision. Therefore, CDLI requested that principals provide on-site supervision. He stated, "So in that instance we try to make everything as straight forward as possible in terms of the material and equipment that they need. We try to make sure that the safety concerns are minimized." He reported that CDLI also used virtual labs as a second choice. Alex stated, "We also created some virtual labs. We have a program that we use called Eduweblabs. It's an offline virtual lab and it is a great program that we use, the ones that match up to our curriculum as close as we can, and the kids do virtual labs."

Alex explained that virtual labs did not need supervision. Therefore, students could do virtual labs at home as well. Regarding lab material, Jack commented, "The

material for labs, core labs are always supposed to be provided by the school, especially like chemicals and/or lab equipment. We provide sensing equipment and/or specialty equipment.”

### **Differentiated Instruction (DI)**

Through differentiated instruction a teacher can meet the needs of all learners. With respect to DI, Jason reported that in the Legacy Model and in the early years of CDLI, group-based instruction was a dominant strategy. He commented:

When that level of group-based instructions was a dominant factor it was very difficult to differentiate instructions, was basically everybody got the same. Once the restriction was lifted, and that's around 2005, when there was enough capacity that the teacher had the flexibility of what they did online and offline, then differentiation became much more realistic.

A CDLI classroom is actually much more similar to a physical classroom. A student can be given differentiated tasks quite easily when the situation requires. William reported that he spent a lot of his time one-on-one with the students to evaluate their learning needs. He commented, “I try to spend that one-on-one time both evaluating what the students’ needs are and in evaluating how they are accomplishing the outcomes of the course.” Jessica also commented, “Our teachers use differentiated instruction where they can.” Alex detailed that he used differentiated instruction by using audio, videos, and by providing extra help during lunch hours or after-school hours. Emily stated that she offered visuals, interactive simulation, and recorded videos to differentiate instruction in her course. She also pointed out that she provided extra help to her students if it was

needed. Nathan stated, “I assume that everybody knows nothing so that way I go back to the basics to make sure they understand and not [try] to overwhelm. I do that step-by-step procedure.” One CDLI administrator, Jack, explained that his teachers used their training, their pedagogy, and their approach, to deal with diverse learners. He also reported that his teachers had had a professional development session on differentiated instruction a few years prior.

### **Offline Support Provided by CDLI**

CDLI provides different types of offline support to its students to help them with their academic work. These types of support include academic support, emotional support, and technological support. All CDLI students are enrolled in traditional schools in their communities. Therefore, they are supported at their schools by other teachers and administrators. CDLI support is in addition to that support. Everything is laid out properly for offline support so that CDLI students can have access to content manager, text, and recorded classes 24/7. All notes, assessment materials, and sample answers are also available 24/7 for CDLI students.

### **Technical Support**

CDLI provides various types of technical supports free of charge to its students. One of the participants, Jason, mentioned, “If the student is unable to access course material for whatever reason, then there is [sic] two or three layers of support available to the students.” First of all, there is a “help desk.” Jason explained that CDLI students could either submit an online trouble ticket or could call a toll-free telephone number. Then,

CDLI manages to solve the issue by contacting a school district or school board technician to do the actual work.

CDLI has two training specialists for all 110 to 115 schools. Tom stated, “We have two training specialists that travel to schools. They ensure that the equipment in place is operational and they will provide instruction to the student or the teacher at the site if required.” He further explained that the training specialists did not travel every day, but went to schools based on need. Tom indicated, “We also provide high quality technology, computers, headsets, if they need cameras, video conference cameras, and we provide them.”

### **Academic Support**

The participants also talked about academic support. They mentioned that all CDLI teachers are willing to provide extra support to students in addition to their regular instructional day. If a student needs some extra help, the E-teachers provide support during lunch hours, after hours, and at night. The student requests help from the E-teacher and the E-teacher sets time aside to provide extra help for that student. The E-teachers also do tutorials and help students out when they can. Tom mentioned that CDLI had a full-time guidance counsellor who deals with students who have had a tough time academically.

### **School Based Support**

The most important part of student support reported by the participants was on-site support. Jessica asserted, “We need support at the students’ actual school because you

cannot work efficiently if the school is not supportive. Because we are just virtual.” Alex discussed the importance of m-teams and stated that the m-team bridge the gap between an E-teacher and the students. There is an opposing point of view. A few participants indicated that they needed little onsite support for their courses. William, for instance, indicated that he did not need a lot of support from m-teams. He stated, “So the thing that I need from the m-teams is more making sure that the computers are all running okay, and making sure that students have a quiet environment to be able to work.” Jason mentioned, “Chapter six of the *Supporting Learning* document had identified other ways that a mediating or a mentor teacher has been found useful. So, we classified that an m-teacher.” Jack explained, “Mediating teams are a group of typically one- to-three people. One of those has to be the administrator of the building, and it is not limited to three people, by the way, but typically one- to-three.”

Barry (2013) indicated that one teacher (m-teacher or mediating teacher) was appointed at each CDLI school for the pilot year. The main responsibility of the m-teacher was to provide basic support to CDLI students. With the pilot year experiment, CDLI administration discovered that there were many responsibilities that an m-teacher had to perform. Barry reported that after the pilot year they came up with the idea of an m-team. Overall, m-teachers provide support in proctoring tests and exams, monitoring student attendance and behavior, and providing general support in learning and self-motivation skills.



## **Guidance & Counselling Services**

CDLI students are supported by a full time guidance counsellor. Jacob reported that they did not have a guidance counsellor for CDLI in the early days. But when the career development course became a mandatory course for high school graduation, Jacob realized that they needed a guidance counsellor. Then, a guidance counsellor was hired. He reported that the guidance counsellor also took care of the tutoring work experience program (TWEP). Jessica reported that she advocated for CDLI students and was a student liaison with the teachers and the parents, and assisted with communication. When I asked about the main responsibility of the guidance counsellor, Jessica reported:

One of my main responsibilities is what we call special circumstance students. So we have a group of students who are unable to attend their local high school because of their medical illness. So they would do the CDLI courses at home with us. Basically I am the main point of contact for them.

Jessica reported that she performed all jobs including doing the referral process, getting medical documentations, and getting approval for special circumstances students from the school boards. She clarified that she was supported by a team of school administrators, IRT teachers, and their local guidance counsellor. She also mentioned that all CDLI students were registered in their local school. Therefore, they had access to their local guidance counsellor. She talked about special circumstances students, “We supply them all the equipment at home. We supply them with their laptop, their printer scanner. They have to have Internet. And the school, then, still supplies text books and stuff.” She explained that some students fell ill and came to CDLI for a limited period. She also took

care of those students. Regarding her role, she described that the good thing about her online role was the flexibility. She could work from anywhere. She reported that she facilitated everything online. She frequently used Skype for meetings. And, she also taught some courses.

### **Tutoring Work Experience Program: (TWEP)**

**Free of cost tutoring.** CDLI students are also supported through free tutoring which involves TWEP (Tutoring Work Experience Program) and Tutoring for Tuition. Jason stated, “These [Tutoring for Tuition] are free services provided after hours for students. For example, you can go online any time when the schedule says the tutor is available and take a tutoring class.” This service is available for all high school students across the province. Jessica explained that CDLI also runs a Tutoring Work Experience Program (TWEP), which is a cost-free program for students and is funded by the government. All the tutors are university students. She stated, “We have 14 tutors online every night for tutoring province-wide. You don't have to be a CDLI student; it could be a Holy Heart student and need a physics tutor.” She further explained that a coordinator, also a TWEP student, helps the guidance counsellor to run the TWEP program effectively. Regarding subjects, she stated:

We have two tutors from Math 10 to 12, two tutors from Chemistry, two tutors from Physics, two tutors for Biology and Science. We have an English tutor, a World Geography, and French. And we have World History, we have Earth Systems, and we have junior high 7 to 9 Science, and 7 to 9 Math.

To find the information regarding the tutoring program, Jessica directed, “On [the] CDLI site you go into on the front page, you see there is a little window says tutoring.

You go to there and then you will see there is information for parents and stuff.” She reported that each tutor had his or her own chat room in Blackboard Collaborate (BBC). She further explained that the tutors are hired from September to May and they have 120 tutoring hours each. She commented, “And students just drop in. They can request some one-on-one time.” She mentioned that TWEP programs ran from May 9 until the end of public exams.

### **Student Dropout**

Regarding student dropout in CDLI courses, the participants indicated that students did drop out of CDLI courses, but the attrition rate was not high and was the same as any traditional school. They further reported that students dropped courses due to a variety of reasons. Jack commented, “Sometimes curriculum is too challenging for that student. So the student has to choose a different curriculum then. So that’s a school-based decision.” William stated, “We always have some dropouts. So most of the time if a student leaves the course, it’s because they would have moved to a different town.” Alex viewed (a) the incorrect selection of the course and (b) scheduling as two main factors for attrition in his courses. Daniel stated, “Sometimes the student was doing an advanced course for the first time and got a little overwhelmed. Sometimes other things happen. Sometimes a student will become ill, sometimes they will change your course to a more appropriate one.”

### **Student Characteristics**

In terms of the preferred characteristics of potential online learners, most of the participants viewed independence as the number one characteristic needed to be

successful in an online learning environment. Laura commented, “The first that comes to my mind is that they have to be independent because they are not always going to have a teacher or a school staff person with them all the time.” Along with independence, participants identified other characteristics. William stated, “I think that they need to be responsible for their own learning.” Laura also considered the use of technology as an important skill. Jessica reported dedication and good organization skills were very important characteristics. Alex commented “A successful e-learner has to have intrinsic motivation. They have to be independent.” Daniel also commented, “Ideally an e-learner at this age is somewhat intrinsically motivated, has some discipline, time management type stuff, and a bit [of] discipline.” One of the participants, Jason, explained what independence meant to him:

I am saying that the student will attend the class, will participate in the activities, and will make efforts to do good work on time. That's what independent means. It also means that they will take advantage of the situations. They will attend, they will do the work, but they will seek help when needed. That's still independence. They know when to look for help.

Another participant said that they did not select students for CDLI. Therefore, they did not know their potential before coming to CDLI. However, they did provide students with skills and directions to find success in the CDLI learning environment. Emma had her own views on characteristics of online learners. She stated, “I think that an e-learner needs to be perceived in the same way that all learners are on the continuum and

that an organization such as CDLI needs to be sure that they can offer a good, an excellent learning experience for all the learners on the continuum.”

### **Continuing Challenges**

From the data analysis, it was apparent that CDLI still faced continuing challenges. The participants viewed connectivity, geography, funding, and school-based issues as major challenges.

#### **Connectivity**

All the participants mentioned that connectivity remained a major challenge in some of the sites working with CDLI. Jessica pointed out, “Some places like Labrador and some remote areas don't have good connectivity at home.” Another participant, Alex, also indicated that connectivity was a major issue. He stated, “So the Internet...still a little bit of [a] challenge in some communities. So, in that sense, depending what community you have in your class, it may influence what you can and what you can't do even today.”

#### **Funding**

Funding has always been a challenge for CDLI. One of the administrative participants wished for the expansion of CDLI. Tom identified that the expansion of CDLI was a challenge because of shrinking budgets. He stated:

If you are going to increase your organization and you got to expand it you need more money. Getting an increased budget over the years was always a big part of

my job; lobbying for money, giving rationale, providing evidence, evidence-driven decision making, which governments all about.

Tom further indicated that maintaining budgets was a challenge because of squeezing government budgets. He also reported that they had lost a leadership position and had a reduction in teaching staff because of budget cuts.

### **Dealing with Ongoing Challenges**

Jack, a current administrator, indicated that dealing with ongoing challenges was itself a challenge. He reported that dealing with 110 to 118 school administrators, E-teachers, staff, and students' parents is a challenging job. He also discussed the issue of scheduling. He stated:

So, as an administrator, dealing with those ongoing and fluid changes is always a challenge. So the way I have to deal with that is I have to be as organized as I can. But I still have to be flexible to be able to say at the end of the day that there are factors beyond that which I can't control and in a typical face-to-face school the administrator is the educational leader.

### **Per Class Student Limit**

In terms of the number of students in a class, one of the administrators noted that they did not have any limit for a class because they did not refuse a student. He elaborated, "It's our mandate at the Department of Education to provide educational programming to students in this province." However, they tried to keep their enrolments appropriate depending on the courses. He stated, "In our oral languages, French primarily,

and in our Performing Arts area, you know, Music pretty well, we tried to keep our number between 12 and 16.” He explained that they tried to maintain the upper limit; 20 students per class.

### **Chapter Summary**

The purpose of this chapter was to report the findings of an investigation into the genesis and development of the Centre for Distance Learning and Innovation (CDLI). Specifically, I examined how and why CDLI came into being, what challenges have been overcome and what remains to be conquered, and how the task of teaching and learning is accomplished in the CDLI environment. In this chapter, I presented the findings of my research study.

As a result of declining enrolment in rural schools, the Legacy Model was established in 1988 by using the Telemedicine Education and Technology Resource Agency (TETRA) network. A telephone-based conferencing system was used to link the classrooms. All of the teaching in the Legacy Model was accomplished through a synchronous mode of delivery. In 1999, a Ministerial Panel was appointed on K-12 educational delivery in the province. The Ministerial Panel recommended the establishment of CDLI, which was established in 2000. Ten internet-based distance education courses were piloted through CDLI in 10 English-speaking districts in the school year 2001-2002. The pilot year was very challenging. There were issues that needed to be addressed. The administration and employees of CDLI addressed those issues in a timely manner.

After the pilot year, CDLI growth increased in terms of course offerings, students' enrolment, school registration, and teacher recruitment. Many new courses were offered for students through CDLI. The students for CDLI were selected by their local schools. The evolution of technology was another main point in the findings of this study. CDLI experimented with the latest technologies related to teaching and learning. In this section, I also described the organizational chart of CDLI and some school-based issues for CDLI.

The report of the Ministerial Panel, *Supporting Learning*, described the roles and the responsibilities of an E-teacher. The participants of this study also described the characteristics of an E-teacher. Most of the participants have the view that e-teaching is a challenging job. Student-teacher separation, students' lost instructional time, and students' unwise use of asynchronous time were some of the challenges of teaching in the CDLI environment. In this section, I also described the process of E-teacher recruitment, teachers' professional development, and E-teachers' qualification.

In the Pedagogy section, I presented the description of teaching strategies used by E-teachers. I also described E-teachers' roles and routines. In this section, I focused on the courses and classes of CDLI, and the support system available for CDLI students when they are online as well as offline.

Finally, I concluded this chapter with the challenges that CDLI continues to encounter as they deliver distance education to the province.



## **Chapter Five**

### **Summary, Discussion, Conclusion, and Recommendations**

In this final chapter, I will provide a brief summary of chapters one to four. This will include the history of distance education in Newfoundland and Labrador, the context of the study (i.e. Chapter One), comments on the literature review (i.e. Chapter Two), research methodology (i.e. Chapter Three), and the research findings (i.e. Chapter Four). The main focus of chapter five will be a discussion of selected research findings. This will be followed by concluding comments and recommendations for further research related to online distance education in Newfoundland and Labrador.

### **Summary**

#### **Chapter One: Introduction**

Chapter one of this study described the history of distance education at the K-12 level. The province of Newfoundland and Labrador is characterized as a province of small rural communities. Some of those communities are only accessible by boat or by helicopter. According to the Newfoundland and Labrador Department of Education (2015-2016), during the 2015-2016 school year, approximately 63% of the province's 262 schools were located in rural areas of the province and half of those schools had less than 200 students.

The small schools in these rural communities face many challenges, such as teacher recruitment and retention, especially in specialized areas; lack of resources; and a small teaching staff. As a result, many small schools have difficulty offering the required

course offerings at the high school level. The dramatic decline in rural population and student enrolment over the last 25 years has further impacted all aspects of small schools (Mulcahy, 2007a). Providing quality K-12 education in such a large, sparsely populated province with limited resources has always been a great challenge for the Government of Newfoundland and Labrador. One way the province has coped with this challenge has been through the introduction of alternative forms of program delivery, in particular, distance education.

In the 1930s, a railcar was used to teach the children in small communities that lived close to the railway track (Newfoundland Government, 1942). The railcar would be attached to a regular train, taken to a community along the tracks, left for a few days, and then transported to the next community a few days later. The program was named “School on Wheels” and the program ran until 1942. In the 1930s, the Department of Education also established a Correspondence Division to run a program in communities that were too small to maintain a school. Correspondence courses were offered to students from Grades 1 to 8. Another provincial effort was the use of school radio broadcasts beginning in 1950. The main purpose of the broadcast was to supplement the curriculum program of studies in courses such as Music, Physical Fitness, Oral French, English, Health, Social Studies, Science, and Vocational Guidance. During the mid-1950s, the Department of Education again introduced the correspondence courses for Grades 1 to 9 and the program ran until 1963.

In 1986, Dr. Frank Riggs was appointed to conduct a study of small schools and make recommendations to enhance educational opportunities for students in small rural

schools. *The Report of the Small Schools Study Project* was published in January 1987. In order to broaden the course offerings in the province's small rural schools, Riggs recommended the significant use of technology for program delivery, especially in small rural high schools. As a result of Riggs' recommendations, the Department of Education established a "Distance Learning Model." In 1988, Advanced Mathematics 1201 was designed and launched as a pilot distance education project (Boone, 2008). This was the beginning of distance education through technology in the province. This model was in place until 1999. Barbour (2007) explained that the distance education model used an audio-graphics system and bridging technology, which facilitated conference calling. He further added that the bridging technology device was accompanied by a telegraphic device that helped in the reproduction of handwriting.

In 1999, the Government of Newfoundland and Labrador appointed a Ministerial Panel on educational delivery in the classroom. The Ministerial Panel recommended that the Department of Education establish a Centre for Distance Learning and Innovation (CDLI) in the province for the purpose of increasing the provision of technology-based distance education. As a result, in December 2000, the Department of Education established CDLI. The main purpose of CDLI was to increase learning opportunities and career options for students, especially in rural areas. CDLI has been in existence for 18 years, but there has not been a systematic and comprehensive investigation of its structure and organization, its effectiveness, and its educational contribution to rural areas.

As stated in chapter one, the purpose of this dissertation was to describe the genesis and evolution of the online distance program provided by the Centre for Distance Learning and Innovation.

## **Chapter Two: Literature Review**

Chapter two focused on a review of the scholarly literature related to K-12 online learning. In chapter two, I explored topics such as definitions of K-12 online learning, how K-12 online learning has developed and grown since its beginnings, the rationale for K-12 online learning, the technology employed for teaching and learning in a K-12 online learning environment, the role of an E-teacher, the challenges to online learners, and factors necessary for students to succeed in a K-12 online learning environment. I noted that the literature specifically related to K-12 online learning was relatively sparse compared to that concerned with post-secondary online learning.

The most common definition of distance learning was used by the International Association for K-12 Online Learning (iNACOL). According to iNACOL (2011), distance learning was defined as a “general term for any type of educational activity in which the participants are at a distance from each other—in other words, are separated in space. They may or may not be separated in time, i.e. asynchronous vs. synchronous” (p. 5). In terms of the growth of K-12 online learning, researchers in the field tend to agree that K-12 online learning has been growing exponentially not only in the United States of America but also in Canada (Barbour, 2013a; Barbour & Reeves, 2009; Clark, 2001; Rice, 2012).

One of the rationales provided for this growth was that online learning was introduced in order to offer a comprehensive curriculum to rural students attending schools that were only able to offer a limited curriculum due to teacher shortages and issues with the recruitment and retention of specialist teachers (Barbour, 2007; Holloway, 2002; Lowe, 2006; Monk, 2007; Mulcahy, 2002). In reviewing the literature on technology usage in the K-12 online learning environment, I also found that a wide range of technological tools were used in these environments.

My literature review also outlined the roles of E-teachers and online learners. Researchers in the field suggested that E-teachers need all the skills and knowledge of traditional teachers, as well as additional qualities and skills (Davis et al., 2007; Rice 2006). Characteristics of online learners were also highlighted. Some researchers argued that K-12 online learning might not be suitable for all learners (Barbour & Mulcahy, 2008). Researchers such as Haughey and Muirhead (1999), as well as Roblyer (2005), argued that online learners needed a specific set of skills to be successful in an online learning environment. This skillset included motivation, independence, self-discipline, self-direction, and access to and expertise with technology.

### **Chapter Three: Methodology**

Chapter three focused on research design and methods. As noted above, the purpose of this study was to describe the genesis and evolution of the online distance program provided by the CDLI. The central research question of this study was stated as

follows: How has the CDLI attempted to equalize educational opportunity for rural high school students? The overall inquiry was guided by four specific research questions:

1. How and why did CDLI come into being?
2. How has the CDLI program developed and evolved?
3. How does learning and teaching occur in the CDLI online learning environment?
4. What challenges have been overcome and what ones remained to be conquered?

Since CDLI is situated in a particular context with clear boundaries, I used a qualitative case study to gain a comprehensive understanding of CDLI (McMillan & Wergin, 2002). Throughout the study, my main focus was description, as well as explanation, of the participants' views. According to Guba and Lincoln (1981), naturalistic inquiry aims at understanding social realities and human perceptions.

Ethical considerations in this research study involved participants' privacy, consent, respect, and safety. A detailed ethics application was submitted and approval was obtained from the Interdisciplinary Committee on Ethics in Human Research at Memorial University of Newfoundland. I ensured that the participants had detailed knowledge of the study. I also made sure that the participants were aware of the study's purpose, methodology, timeline, data usage and benefits, and measures in place to protect anonymity.

Forty participants were approached through emails to participate in this study. Fourteen of them showed a willingness to participate. All fourteen participants of the study, present and former employees at the CDLI, were purposefully selected to gain

better understanding of the case. The data were collected through semi-structured interviews (Roulston, 2010). All the interviews were recorded and then transcribed. The data for this study were also generated through document analysis. The documents included the official CDLI website, as well as the reports and the papers that were published on CDLI in past years.

Data generated throughout this research study were analyzed by using the Computer Assisted Qualitative Data Analysis (CAQDAS) software NVivo. The data were reviewed by me through listening to the original interviews. All the data were saved in separate files. The text was broken into meaningful segments, after which a list of categories was established. Then, the categories were combined into sub-themes. Finally, the sub-themes were merged into the main themes.

To make sure that the findings and interpretations were accurate, the following steps were taken: triangulation, member checking, peer debriefing, and prolonged data gathering. Triangulation was achieved by interviewing different participants who were representatives from all areas of CDLI. Furthermore, triangulation was gained by employing different types and methods of data collection. For member checking, the participants were given an opportunity to check the accuracy of the findings. Peer debriefing also occurred through discussions with members of my supervisory committee. The data for this study were gathered over a period of six months.

## **Chapter Four: Findings**

The findings were reported in chapter four of this study. Findings related to each research question are not specifically addressed here because of the overlapping nature of the findings and their interconnectedness to various topics in CDLI. The findings of the study were presented as a series of themes. The themes were:

- Genesis of CDLI
- Pilot Year
- Growth and Development
- Evolution of Technology
- E-teachers
- Pedagogy
- Continuing Challenges

## **Discussion**

In this section I will discuss selected aspects of the findings. As I discuss the findings I will be highlighting, where appropriate, the distinctive characteristics of CDLI that make it somewhat unique among virtual schools. First, I will discuss why CDLI was created and the essential role it plays in the provision of rural education in Newfoundland and Labrador.



### **Meeting the Programming Challenges of Small Rural High Schools**

The provision of an equitable education has always been a challenge for the small rural high schools in Newfoundland and Labrador (Mulcahy, 2007a). Because the rural schools were small, and in some instances had very low enrolment, only a limited number of teachers were assigned to such schools. Invariably, this meant teachers had a very heavy workload and often had to teach outside their area of expertise. If the small rural school was situated in a remote and isolated area, it was very difficult to recruit subject specialist teachers and almost impossible to retain them. Newfoundland and Labrador was not alone in these challenges; they were similar to small rural schools in many places. Many researchers who work in rural studies demonstrated that the recruitment and retention of certified and qualified teachers in rural communities has been a perennial issue (Herzog & Pittman, 1995; Holloway, 2002; Lowe, 2006; Monk 2007). In order to address some of the challenges, distance education has been used in the province. Other researchers also proposed distance education as a solution to the shortage of teachers and limited programming (Barbour, 2007; Barbour & Mulcahy, 2006; Burney & Cross, 2006; Hobbs, 2004; Jimerson, 2006).

Distance education was initiated in Newfoundland and Labrador in 1988 for the specific purpose of improving the quality of educational provision in small rural high schools (Boone, 2008). This goal was to be accomplished by increasing the availability of academic courses to small rural high schools through technology. For 12 years the Legacy Model of distance education provided this service. In 1999, the Government of Newfoundland and Labrador appointed a Ministerial Panel on the delivery of K-12

education in the province to address the issues of curriculum equity, changing demographics, teacher shortages in specific teaching disciplines, and the need to be cost effective (Johnson, 2011). CDLI was established in 2000 based on the recommendations of the Ministerial Panel and their report *Supporting Learning* (Sparkes & Williams, 2000).

The traditional challenges referred to above were exasperated by declining enrolment. Enrolment had continued to dramatically decline in rural areas resulting in severe reductions in the numbers of teachers and resulting programming cuts (Mulcahy, 2002). Online learning had been proposed as an alternative to programming cuts (Barbour, 2007; Barbour & Mulcahy, 2006). The Government of Newfoundland and Labrador realized that changes were needed if small rural schools were to remain viable. *Supporting Learning* made two important recommendations: increase the number of distance courses offered and change the delivery method. The change recommended the implementation of an online method of distance education. Following a pilot year, full implementation of online distance education took place during the 2002-2003 academic year.

Rice (2006) stated that online learning provided broad curriculum to students, especially in rural schools. As it exists today, CDLI makes the size and location of small rural schools irrelevant with their ability to offer a full academic program to their students. Essentially, CDLI is a province-wide virtual school whose sole purpose is to provide academic programming to small rural high schools in Newfoundland and

Labrador. The programs and courses offered by CDLI were and are identical to those provided in the province's brick-and-mortar schools.

CDLI provided ample opportunities to rural high school students by offering them a wide range of courses through specialist teachers. De la Varre, Keane, and Irvin (2010) explained that K-12 online learning had the potential to attract learners by offering them a variety of courses and programs. The Center for Distance Learning and Innovation (CDLI) was a unique model for various reasons:

1. CDLI was the only virtual school in the province of Newfoundland and Labrador.
2. CDLI was a provincial not-for-profit virtual school that was funded by the government of Newfoundland and Labrador. Therefore, CDLI students were not charged any fees. CDLI even provided all necessary equipment free of charge to the host schools for CDLI courses, including computers, headsets, and microphones. In some areas of the United States, Clark (2001) indicated that on average a student paid \$300 per semester.
3. CDLI and the host schools formed a partnership that worked together. Students could take all of their courses through CDLI. However, they had to be registered at their local schools.
4. CDLI offered the whole provincial curriculum online. Another element unique to CDLI was the use of synchronous and asynchronous modes of delivery, particularly synchronous. CDLI synchronous classes were recorded. Therefore, if a student was unable to attend the class for any reason, he or she could access recorded classes 24 hours a day, seven days a week. This was consistent with

Abram's (2005) statement that one of the main benefits of online learning was that many resources were easily available to learners such as learning material, websites, and readings.

### **Pilot Year**

The findings of this study acknowledged the decision to first implement CDLI with a pilot year (2001-2002). This was a critical decision. The participants in the study insisted that what was learned during that pilot year was vital to the successful development of online distance education in the province. Ironically, the *Supporting Learning* document had suggested that there was no need for CDLI to begin with a pilot year. The report stated, "Note that no pilot phase is proposed. Sufficient experience exists locally and elsewhere to justify [an immediate] start" (Sparkes & Williams, 2000, p. 81). The leadership team of CDLI was convinced otherwise and decided that a pilot year was necessary and would be advantageous for future growth and development. CDLI was charting new territory regarding distance education in Newfoundland and Labrador. The team knew that there was much they did not know and many uncertainties existed as to how distance learning would work. The CDLI team insisted a pilot year was necessary and they prevailed.

In the 2001-2002 school year, 10 internet-based distance education courses were piloted in 10 English-speaking districts (Barry, 2013). Each district was responsible for one online course, for selecting a mediating teacher, and for appointing an E-teacher

(Barbour & Mulcahy, 2004). In the pilot year, the Legacy Model and CDLI were working side by side. The pilot year proved significant for improvisation and innovation.

Rice (2006) explained that some K-12 online schools faced numerous issues such as lack of funding, technical issues, and untrained personnel. Perhaps the most important dimension of the pilot year was the visits by the CDLI team to each of the pilot schools. CDLI used the visits to provide assistance to the students on how to learn in an online environment and provide direction to school personnel on how to support their students taking online courses. The team also provided technical direction and instruction for those teachers in the school who would be responsible for the equipment and for monitoring students.

Equally important, the visiting team held meetings with the teachers in the school and provided opportunities for the schools to tell them what was working and what was not. Important information and insight was derived from those visits in regard to pedagogical issues such as school-based support provided by the m-teacher, communication between schools and CDLI personnel, and a variety of technical issues. Berge and Mrozowski (1999) reported that challenges to online learning were numerous, and included concerns about cultural change, concerns about pedagogical change, and concerns over the lack of support for teachers. The value of these school-based visits could not be overestimated. The CDLI team respected the school personnel and were prepared to listen to them.

As a result of the information garnered from these visits and other input from schools, an important change was made regarding school-based support. Barbour and Mulcahy (2004) stated that in some learning environments, students needed and received significant support from on-site personnel. The schools made it clear there were too many demands being placed on the m-teacher. These tasks were being carried out by a school-based teacher who already had a full work load. It was during the pilot year that CDLI decided they would have m-teams in the schools; the job of helping CDLI would be shared by several teachers, not just one.

### **Program Growth and Development**

Full implementation of CDLI occurred during the 2002-2003 school year. As mentioned by Berge and Mrozowski (1999), one of the challenges to online learning was concerns about cultural change. The pilot year of CDLI had demonstrated that the new online distance education model was more than viable and any remaining sceptics were persuaded by CDLI. As a consequence, the Legacy Model was discontinued. During the past 15 years, CDLI has grown in terms of the number of courses offered, the number of student registrations, and the number of schools served. During the 2016-2017 school year, CDLI offered 38 courses with 1764 course registrations to 968 students from 103 rural schools (Barbour & LaBonte, 2017).

### **E-teachers**

As with any educational enterprise, the keys to successful student learning are the teachers and effective pedagogy. I will discuss CDLI pedagogy later in this chapter. In

this section I will focus on E-teachers. The participants in my study were unanimous in their view that CDLI's teachers were integral to the program's success. E-teachers needed all the skills and knowledge of traditional teachers; they also needed additional qualities and skills (Davis, Roblyer, Charania, Ferdig, Harms, Compton, & Cho, 2007; Hawkins, Graham, & Barbour, 2012; Rice, 2006). The government document *Supporting Learning* (2000) envisioned roles, responsibilities, and expectations for an E-teacher. As well, a wide range of preferred E-teacher characteristics were identified by this study's participants, including (a) subject expertise, (b) empathy, (c) strong interpersonal skills, (d) innovativeness, (e) a good learner, (f) patience, (g) passion, (h) organizational, and (i) technology literate (Goodyear et al., 2001). E-teaching was also viewed as a challenging job. E-teachers enjoyed the flexibility of time but, simultaneously, they spent more time and energy with online teaching than the teachers who taught in traditional schools (Archambault, 2010).

Dawson, (2009) suggested that an E-teacher's choice of pedagogy, content, and technology could play a major part in students' online learning experience. CDLI selected their E-teachers following very particular criteria. Teachers had to have expertise in their subject area, be an experienced high school teacher, and have a demonstrated student-centred orientation. To be selected, candidates also had to demonstrate a knowledge or aptitude for the use of technology in learning. Preference was given to those who had worked with the Legacy Model. In order to build a successful learning environment, Salmon (2003) suggested that E-teachers should help learners in all learning activities,

including the complex ones. It was clear from the findings that CDLI's E-teachers were dedicated individuals who cared about the education of students in rural schools.

Once selected, E-teachers were given some initial training and a number of professional development sessions each year. Some sessions were face-to-face, while others took place online. E-teachers used a wide range of techniques to teach online students. E-teachers needed all the skills and knowledge of traditional teachers, they also needed additional qualities and skills (Davis, Roblyer, Charania, Ferdig, Harms, Compton &, Cho, 2007; Hawkins, Graham & Barbour, 2012; Rice, 2006). In addition, E-teachers had to perform multiple roles. This is consistent with the findings of Goodyear et al. (2001). They stated the role of an E-teacher as (a) a content facilitator, (b) a metacognition facilitator, (c) a process facilitator, (d) an advisor, (e) an assessor, (f) a technologist, and (g) a resource provider.

### **Student Selection**

Roblyer and Davis (2008) explained that sometimes schools, themselves, set the criterion for the selection and admission of online learners. From the beginning of distance education in Newfoundland and Labrador in 1988 to the present day, the selection of students to participate in either the Legacy Model or the CDLI model was first and foremost the responsibility of the school. The principal of the school would nominate which students could or should take part.

One important thing that has changed, however, is the nature of students' participation in online learning in the province. When distance learning began in 1988



and in the early years of CDLI, participation in distance learning was restricted to academically high-achieving students who exhibited the necessary attributes to be successful. Such attributes, as the literature identified, emphasized qualities such as independence, self direction, high motivation, and an ability to work without constant and direct supervision (Barbour & Mulcahy, 2004; Haughey & Muirhead, 1999; Roblyer, 2005). However, the continuing decline in enrolment in small rural schools forced a reconsideration of these criteria. As enrolment fell and cuts were made to the teaching staffs of rural schools, the only way for many rural students to take the courses they needed and remain in their home communities was through CDLI. Many students who would not normally be considered suitable candidates were forced to take distance courses if they wished to continue in an academic stream.

As Roblyer (2006) stated, online learners in the K-12 online learning environments did not succeed equally well. Barbour and Mulcahy (2008) claimed that K-12 online learning might not be appropriate for all learners. One of the consequences was that many rural students opted for a less demanding, non-academic program that could be offered in the school in a face-to-face environment. Unfortunately this had the possibility of severely limiting their life chances.

### **Pedagogy**

In chapter four, a detailed description of how learning and teaching took place in CDLI online courses was illustrated. Here, I want to highlight what study participants believed made learning so successful for students enrolled in CDLI courses. There are

two aspects to this: (a) the manner in which students were supported in a synchronous environment; (b) the support available to students when they were engaged in asynchronous activities. Both synchronous and asynchronous activities were crucial to the success of CDLI, but most participants in the study contended that it was the extensive synchronous component that was most significant and was also what distinguished CDLI from most other virtual schools.

According to Rice (2006), in an online learning environment, instructions were delivered synchronously, with students and teachers communicating in real time; and asynchronously, with students working at different times, or a combination of both. Once again, the CDLI leadership had to refute the government appointed commission who in their report *Supporting Learning* recommended eliminating all synchronous interaction in the new CDLI model of distance education. Sparkes and Williams (2000) stated, “Internet-based distance learning offers the opportunity to move away from the scheduling constraints of synchronous programming and to help students become accustomed to new ways of learning and to the technologies that are becoming all-pervasive in daily life” (p. 72). CDLI chose to offer courses in synchronous learning.

In a synchronous mode, tools such as video conferencing and audio conferencing were used for communication among learners and teachers (Rice, 2012). Synchronous learning had been a key component of the Legacy Model. The CDLI team knew it would be vital to the new model of online learning. Hence they once again prevailed and built a strong synchronous component into the new model. One of the proponents of the synchronous mode of delivery argued, “It had been judged that if we don't continue with

synchronous model, we are likely to going to lose [sic] a lot of students because the students wouldn't continue with the course without active support from the teachers in real time.”

CDLI administration used a combination of synchronous and asynchronous modes.

In addition to the valuable synchronous instructional periods, CDLI students were supported in a number of ways when they were not online. The most important of these was the m-teams in place at the schools. School-based personnel were very supportive of online learners (Irvin et al., 2009). This support might come as a result of their designated duties as members of the m-team or it may occur informally simply because they were teachers in the school and the students needed assistance (Barbour & Mulcahy, 2009). Schools saw themselves as partners with CDLI in a joint effort to provide quality education for rural students.

Roblyer (2006) described the characteristics of successful online schools. One of the characteristics was that the students were supported by their schools. CDLI also offered a variety of online tutoring sessions for students such as the Tutoring Work Experience Program (TWEP) and Tutoring for Tuition. These services were freely available not only to CDLI students, but also to other high school students throughout the province of Newfoundland and Labrador. All the tutors were university students who were hired from September to May.

## **Technology**

As was illustrated in chapter four, CDLI took full advantage of innovative ways to use technology. Therefore, CDLI constantly experimented and improvised the use of technology for teaching and learning. Researchers in the field indicated that a variety of tools and software were utilised to offer K-12 online learning (Barbour & Unger, 2014; Davis & Niederhauser, 2007; Rice, 2006). CDLI used various tools and software for synchronous and asynchronous communication such as Netmeeting, Meeting Point, WebCT, Tutor's Edge, VClass, Camtasia, Captivate, Blackboard Collaborate (BBC) and Desire 2 Learn (D2L). Abram (2005) identified that BBC and D2L were commonly used tools in virtual schooling. CDLI was always in search of better tools and software.

## **Continuing Challenges**

In chapter four, I outlined the various challenges identified by the study participants that CDLI faced as it initiated online distance education in Newfoundland and Labrador. Some of these challenges were a result of the geography and dispersed population, as well as the lack of supportive technical infrastructure in the province. Rice (2006) made clear that online schools faced many challenges including lack of funding, technical issues, and untrained personnel. One of the major issues was the attempt to establish secure and reliable connectivity to CDLI schools. Providing all participating schools with the required equipment and teaching both students and teachers how to use it was also an issue.

As Berge and Mrozowski (1999) indicated, online learning was characterized by challenges. In the beginning, CDLI also had to deal with many doubters. There were those who believed that the Legacy Model was sufficient and there was no need to change to an online model. The fact that the province had two time zones made synchronous delivery problematic, as did the fact that there was no universal time table for the provinces' schools, meaning there was a variety of start times for the instructional day.

Another difficulty was the recruitment and training of a group of E-teachers, as well as a support team in the schools. This was consistent with the findings of Irvin et al. (2010) who found that untrained personnel was a major barrier to distance education. CDLI was starting from scratch. It had no model to follow in terms of a province-wide virtual school dedicated to meeting the academic programming needs of all rural schools and making extensive use of synchronous interactions between teachers and students while using adaptations of the existing provincial curriculum. Much innovation and improvisation was needed.

As was illustrated in chapter four, the CDLI team met these challenges with confidence, creating innovative solutions as they evolved. By most standards, CDLI can be judged a success. As stated earlier, their capability of providing a full academic program for their students makes the size and location of small rural high schools irrelevant. And students achieved equally well in online course as they do in face-to-face programs (Barbour & Mulcahy, 2006; Cavanaugh et al., 2004; McLeod et al., 2005; Seifert, Sheppard, & Vaughan, 2009)

Despite the success and progress of CDLI, however, challenges remain. There are still issues related to connectivity in many rural communities (Hannum et al., 2009). In the more remote and isolated areas of the province, students could go for days without being able to participate in their synchronous online classes. On occasion, problems might also occur in less isolated places. Although all synchronous classes are recorded and accessible later to students, connectivity issues remain problematic. The issue is further exacerbated by the fact that there are a limited number of technicians available to go to the school experiencing the problem. And it might take the technician several days given the isolated geography to travel to the school and fix the problem.

School-based support also remains an issue. As has been noted, each CDLI school has an m-team that consists of school-based teachers with various responsibilities related to assisting online students with their courses (Barbour & Mulcahy, 2009). These responsibilities are in addition to their full-time teaching load. This creates an unreasonable demand on these teachers, especially in smaller schools. Related to that is the fact that during asynchronous instructional periods, students are often left unsupervised because m-teams have their own teaching responsibilities. While some students use this time productively, others are often on the Internet, playing video games and engaging in other online activities not related to their school work. The solution to this would be having distance students supervised during their off-line classes. Irvin et al. (2009) mentioned that [in some situations] an online facilitator was directly available to students and was physically present at the school.

Another ongoing issue is school-based teachers providing academic tutoring for online students. CDLI officially claims that such assistance is not required or necessary. However, there is anecdotal evidence that clearly indicates that in many schools online students seek and receive academic help from school-based teachers (Barbour & Mulcahy, 2004). These teachers are not compensated for the help provided. Nor is it part of their workload.

Barbour and Labonte (2016) reported that most K-12 online learning programs were funded by the provincial and territorial governments in Canada. One other continuing challenge is related to economics. When CDLI began, it was provided for and supported by a fairly generous budget. More recently, due to the financial crisis in the province, CDLI has seen its budget eroded. This has impacted everything from equipment replacement, to professional development, to maintenance provision.

### **Implications for Practice**

My goal with this study was to gain an enhanced understanding of CDLI and offer recommendations to improve the experience of teaching and learning through it. The findings of this study indicated that there were three areas of CDLI instruction that need to be addressed:

1. The supervision of CDLI students at the host schools. If teachers supervised CDLI students appropriately, there might be less of a chance of students wasting their time, especially in asynchronous classes. There were indeed schools where student supervision was very poor.

2. The need to acknowledge the efforts of m-teachers who perform the CDLI responsibilities voluntarily. M-teachers facilitated CDLI courses in addition to their full time workload. Therefore, there was a need to acknowledge their efforts by compensating them financially or decreasing their regular workload.
3. Connectivity was still a primary concern at some of the remote schools in rural Newfoundland and Labrador. If connectivity issues were addressed there is hope for better synchronous and asynchronous communications, which could result in better teaching and learning experiences.

### **Recommendations for Future Research**

Upon completing the first study that has been conducted on virtual schooling in Newfoundland and Labrador, with the focus on the genesis and development of CDLI and its contribution to rural schooling, I do have some recommendations for future research in the area of virtual schooling in Newfoundland and Labrador.

This research was carried out using a qualitative research method. For future studies, it would be beneficial to engage in quantitative research. Also, a study could be conducted on students' perceptions on learning through CDLI. Future research could be helpful to understand how students are selected for CDLI courses. Additionally, a research study could be conducted on the impact of CDLI students on fellow classmates. Researchers could conduct a study to investigate the responsibilities of m-teams and how they fulfill their responsibilities. A study should be conducted to investigate the issues



that host schools face due to CDLI courses. Further research could be conducted that examines the effectiveness of CDLI courses.

This research study used a qualitative case study approach. Therefore, the findings of this study cannot be generalized to other contexts. However, similarities can be found with other areas engaged in virtual schooling.

### **Conclusion**

The purpose of this case study was to describe the genesis and evolution of the online distance program provided by the Centre for Distance Learning and Innovation (CDLI). This study's main objective was to explore how CDLI has attempted to equalize educational opportunities for rural high school students in Newfoundland and Labrador. This research illustrated the creation of CDLI, beginning with the pilot year and then continuing with its growth and development. Its pedagogy and evolution of technology were also main elements of my research findings. I have offered some recommendations for practice and I have also made some recommendations for future research.

When I came to Newfoundland and Labrador from my native Pakistan, I knew nothing of the province's struggle for educational equity within its rural schools. I knew very little about distance education and online learning. During the last four years while engaged in this study I have greatly advanced my knowledge and understanding on all fronts. I have also developed a deep appreciation for the struggles of rural students and the dedicated teachers who strive to provide them with a quality education.

As I became knowledgeable about CDLI, I developed a further appreciation of the work its teachers and management did and continue to do in order to help increase educational equality in rural areas. They, too, are a dedicated group of educators who take a personal as well as a professional interest in the rural schools and in the students of the province. I have been greatly enriched by this experience. And I know my work has only begun in this area.

## References

- Abram, S. (2005). The role of e-learning in the k-12 space. *MultiMedia & Internet@ Schools*, 12(2), 19-21.
- Adelstein, D., & Barbour, M. K. (2017). Improving the k-12 online course design review process: Experts weigh in on iNACOL National Standards for Quality Online Courses. *The International Review of Research in Open and Distributed Learning*, 18(3), 47-82.
- Allen, I., & Seaman, J. (2010). *Class differences: Online education in the United States*. Wellesley, MA: Sloan Consortium.
- Anderson, A.B., Augenblick, J., Decesare, D., & Conrad, J. (2006). *Costs and funding of virtual school: An examination of the costs to start, operate and grow virtual schools, and a discussion of funding options for states interested in supporting virtual schools*. (A report prepared for the BellSouth Foundation). Retrieved from <http://www.charterschooltools.org/tools/Costs&Funding.pdf>
- Archambault, L. (2010). Identifying and addressing teaching challenges in k-12 online environments. *Distance Learning*, 7(2), 13-17.
- Barbour, M. (2005). From telematics to web-based: The progression of distance education in Newfoundland and Labrador. *British Journal of Educational Technology*, 36(6), 1055-1058.

- Barbour, M. K. (2007). Portrait of rural virtual schooling. *Canadian Journal of Educational Administration and Policy*, 59, 1-21.
- Barbour, M. K. (2010). Researching k-12 online learning: What do we know and what should we examine? *Distance Learning*, 7(2), 7-12.
- Barbour, M. K. (2011). The promise and the reality: Exploring virtual schooling in rural jurisdictions. *Education in Rural Australia*, 21(1), 1-19.
- Barbour, M. K. (2012). *Review of overcoming the governance challenge in k-12 online learning*. Boulder: National Education Policy Centre. Retrieved from [http://www.greatlakescenter.org/docs/Think\\_Twice/TT\\_Barbour\\_CentTech.pdf](http://www.greatlakescenter.org/docs/Think_Twice/TT_Barbour_CentTech.pdf)
- Barbour, M. K. (2013a). The landscape of k-12 online learning: Examining what is known. In M.G. Moore (Ed.) *Handbook of distance education*, (3<sup>rd</sup> ed., 574-593) New York, NY: Taylor & Francis.
- Barbour, M. K. (2013b). *State of the nation: K-12 online learning in Canada*. Victoria, BC, Canada: iNacol. Retrieved from <http://k12sotn.ca/wp-content/uploads/2016/09/StateOfTheNation2012.pdf>
- Barbour, M. K. (2014). A history of international k-12 online and blended instruction. In R.E. Ferdig & K. Kennedy (Eds.) *Handbook of research on k-12 online and blended learning* (pp. 25-49). Pittsburgh, PA: ETC Press.
- Barbour, M.K., Archambault, L., & DiPietro, M. (2013). K-12 online distance education: Issues and frameworks. *American Journal of Distance Education*, 27(1), 1-3.

- Barbour, M. K., & Hill, J. (2011). What are they doing and how are they doing it? Rural student experiences in virtual schooling. *International Journal of E-Learning & Distance Education*, 25(1), 1-14.
- Barbour, M. K., & LaBonte, R. (2015). *State of the nation: K-12 e-learning in Canada*. Abbreviated edition. Canadian e-Learning Network.  
doi:10.13140/RG.2.1.2872.9207
- Barbour, M. K., & LaBonte, R. (2016). *State of the nation: K-12 e-learning in Canada*. Retrieved from <http://k12sotn.ca/wp-content/uploads/2016/12/StateNation16.pdf>
- Barbour, M. K., & LaBonte, R. (2017). *State of the nation: K-12 e-learning in Canada*. Retrieved from <http://k12sotn.ca/wp-content/uploads/2018/02/StateNation17.pdf>
- Barbour, M. K., & Mulcahy, D. M. (2004). The role of mediating teachers in Newfoundland's new model of distance education. *The Morning Watch*, 32(1).
- Barbour, M.K., & Mulcahy, D. M. (2006). An inquiry into retention and achievement differences in campus based and web based AP Courses. *Rural Educator*, 27(3), 8-12.
- Barbour, M. K., & Mulcahy, D. (2008). How are they doing? Examining student achievement in virtual schooling. *Education in Rural Australia*, 18 (2), 63-74.
- Barbour, M. K., & Mulcahy, D. M. (2009). Beyond volunteerism and good will: Examining the commitment of schoolbased teachers to distance education. *Education Faculty Publications*. Paper 177. Retrieved from

[http://digitalcommons.sacredheart.edu/cgi/viewcontent.cgi?article=1179&context=ced\\_fac](http://digitalcommons.sacredheart.edu/cgi/viewcontent.cgi?article=1179&context=ced_fac)

Barbour, M. K., & Reeves, T. C. (2009). The reality of virtual schools: A review of the literature. *Computers & Education*, 52(2), 402-416.

Barbour, M. K., & Unger, K. L. (2014). Strategies for overcoming common obstacles in the online environment: Issues in virtual school teaching. In A.A. Pina & A.P. Mizell (Eds). *Real life distance education: Case studies in practice* (pp 21-40). Charlotte, NC: Information Age Publishing.

Barry, M. (2013, February 18). *Not Banjaxed ...yet: Give it time*. [Web log post]  
Retrieved from <https://mauriceabarry.wordpress.com/2013/02/18/distance-education-in-nl-part-1-the-setting/>

Berge, Z. L., & Clark, T. A. (2005). *Virtual schools: Planning for success*. New York NY: Teachers College Press.

Berge, Z. L., & Mrozowski, S. (1999). Barriers to online teaching in elementary, secondary, and teacher education. *Canadian Journal of Educational Communication*, 27(2), 125-138.

Block, E. S., & Erskine, L. (2012). Interviewing by telephone: Specific considerations, opportunities, and challenges. *International Journal of Qualitative Methods*, 11(4), 428-445.

Blomeyer, R. (2002). *Online learning for k–12 students: What do we know now?*

Naperville, IL: North Central Regional Educational Laboratory. Retrieved from <http://www.ncrel.org/tech/elearn/synthesis.pdf>.

Bof, A. M. (2004). Distance learning for teaching training in Brazil. *The International Review of Research in Open and Distance Learning*, 5(1), 1-14.

Boone, W. (2008). *The evolution of e-learning in small rural schools in Newfoundland and Labrador*. Killick Centre for E-learning Research. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.536.8895&rep=rep1&type=pdf>

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27-40.

Burgess-Watkins, K. (2011). Online learning opportunities for k-12 students in Florida's Nassau County. *Distance Learning*, 8(1), 1-7.

Burney, V. H., & Cross, T. L. (2006). Impoverished students with academic promise in rural settings: 10 lessons from Project Aspire. *Gifted Child Today*, 29(2), 14-21.

Carnevale, D. (2001). It's education online. It's someplace you aren't. What's it called? *Chronicle of Higher Education*, 47(8), p. A33.

Cassell, C., & Symon, G. (2004). *Essential guide to qualitative methods in organizational research*. London; Thousand Oaks: Sage Publications.

- Cavanaugh, C. S. (2001). The effectiveness of interactive distance education technologies in k-12 learning: A meta-analysis. *International Journal of Educational Telecommunications*, 7(1), 73–88.
- Cavanaugh, C. S., Barbour, M. K., & Clark, T. (2009). Research and practice in k–12 online learning: A review of open access literature. *The International Review of Research in Open and Distance Learning* 10 (1). Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/607/1182>
- Cavanaugh, C. S., Gillan, K. J., Kromrey, J., Hess, M., & Blomeyer, R. (2004). *The effects of distance education on k–12 student outcomes: A meta-analysis*. Naperville, IL: Learning Point Associates.
- Center for Distance Learning & Innovation (2014). *About Us*. Retrieved from <https://www.cdli.ca/about-us.html>
- Choi, H. J., & Johnson, S. D. (2005). The effect of context-based video instruction on learning and motivation in online courses. *The American Journal of Distance Education*, 19(4), 215-227.
- Clark, T. (2001). *Virtual Schools: Trends and Issues. A Study of Virtual Schools in the United States*. Retrieved from WestEd, Phoenix, AZ: Distance Learning Resource Network: <http://files.eric.ed.gov/fulltext/ED462923.pdf>



- Clark, T. (2013). The evolution of distance and online education in American schools. In M G. Moore (Ed.), *Handbook of distance education* (3rd ed., pp. 555-573). New York, NY: Taylor & Francis.
- Clark, T., & Barbour, M. (2015). *Online, blended, and distance education*. Sterling, Virginia: Stylus.
- Clarke, R. E. (1983). Reconsidering research on learning from media. *Review of Educational Research*, 53(4), 445-459.
- Collins, J. (2001). Using the Internet as a distance education tool in selected secondary school areas. *Journal of Research on Computing in Education*, 33 (4), 431-456.
- Compton, L., Davis, N., & Correia, A. (2010). Pre-service teachers' preconceptions, misconceptions, and concerns about virtual schooling. *Distance Education*, 31(1), 37-54.
- Compton, L. K. L., Davis, N., & Mackey, J. (2009). Field experience in virtual schools-to be there virtuality. *Journal of Technology and Teacher Education*, 17(4), 459-477.
- Cook, A. (2008). A literature review of k-12 virtual learning communities. Retrieved from <http://www.usask.ca/education/coursework/802papers/cook/index.htm>
- Cowan, K. (2009). Learning across distance. *The Education Digest*, 74(9), 4-8.
- Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Boston, MA: Pearson.

- Creswell, J. W. (2013). *Qualitative inquiry & research design*. Thousand Oaks, CA: Sage Publications.
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: Sage publications.
- Dabbagh, N. (2007). The online learner: Characteristics and pedagogical implications. *Contemporary Issues in Technology and Teacher Education (CITE)*, 7(3). Retrieved from <http://www.citejournal.org/vol7/iss3/general/article1.cfm>
- Darrow, R. (2010). *A comparative study between online charter high schools and traditional high schools in California*. [Unpublished doctoral dissertation]. California State University, Fresno, CA.
- Davis, N., & Niederhauser, D. S. (2007). Virtual schooling. *Learning & Leading with Technology*, 34(7), 10-15.
- Davis, N. E., & Roblyer, M. D. (2005). Preparing teachers for the “Schools that technology built”: Evaluation of a program to train teachers for virtual schooling. *Journal of Research on Technology in Education*, 37(4), 399-409.
- Davis, N., Roblyer, M.D., Charania, A., Ferdig, R., Harms, C., Compton, L.K.L., & Cho, M.O. (2007). Illustrating the “Virtual” in virtual schooling: Challenges and strategies for creating real tools to prepare virtual teachers. *Internet and Higher Education*, 10(1), 27-39.

- de la Varre, C., Keane, J., & Irvin, M. J. (2010). Enhancing online distance education in small rural U.S. schools: A hybrid, learner-centred model. *Research in Learning Technology, 18*(3), 193-205.
- de la Varre, C., Keane, J., & Irvin, M. J. (2011). Dual perspectives on the contribution of on-site facilitators to teaching presence in a blended learning environment. *Journal of Distance Education, 25*(3) 1-14.
- Denzin, N. K. (1970). *The research act: A theoretical introduction to sociological methods*. New York, NY: Aldine.
- DiPietro, M., Ferdig, R. E., Black, E. W., & Preston, M. (2008). Best practices in teaching k-12 online: Lessons learned from Michigan Virtual School teachers. *Journal of Interactive Online Learning, 7*(1), 10-35.
- Fenig, S., & Levav, I. (1993). Telephone vs Face-to-Face Interviewing in a Community Psychiatric Survey. *American Journal of Public Health, 83*(6), 896-898.
- Retrieved from  
<http://www.epnet.co/cgi-bin/epwbi...cs=10/reccount=19/startrec=11/ft=1>
- Ferdig, R. E., Cavanaugh, C., DiPietro, M., Black, E. W., & Dawson, K. (2009). Virtual schooling standards and best practices for teacher education. *Journal of Technology and Teacher Education, 17*(4), 479-503.

- Friend, B., & Johnston, S. (2005). Florida Virtual School: A choice for all students. In *Virtual schools: Planning for success*, 97-117. New York, NY: Teachers College Press.
- Fulton, K. (2002). Brave new world of virtual schooling in the U.S. *National Association of State Boards of Education*. Retrieved from [http://www.techknowlogia.org/TKL\\_Articles/PDF/380.pdf](http://www.techknowlogia.org/TKL_Articles/PDF/380.pdf)
- Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry*, 12(2), 219-245.
- Gall, M. D., Gall, J. P., & Borg, W. R. (2003). *Educational research: An introduction*. Boston, MA; Montreal, QC: Allyn & Bacon.
- Goodyear, P., Salmon, G., Spector, J., Steeples, C. & Tickner, S. (2001). Competencies for online teaching: A special report. *Educational Technology Research and Development*, 49(1), 65-72.
- Goold, A., Coldwell, J., & Craig, A. (2010). An examination of the role of the e-tutor. *Australian Journal of Educational Technology*, 26(5), 704-716.
- Greenway, R., & Vanourek, G. (2006). The virtual revolution: Understanding online schools. *Education Next*, 6(2), 34-41.
- Guba, E. G., & Lincoln, Y. S. (1981). *Effective evaluation: Improving the usefulness of evaluation results through responsive and naturalistic approaches*. San Francisco: Jossey-Bass.

- Hannum, W. H., Irvin, M. J., Banks, J. B., & Farmer, T. W. (2009). Distance education use in rural schools. *Journal of Research in Rural Education*, 24(3), 1-15.
- Harvey, D., Greer, D., Basham, J., & Hu, B. (2014). From the student perspective: Experiences of middle and high school students in online learning. *American Journal of Distance Education*, 28(1), 14-26.
- Harvey, W. S. (2011). Strategies for conducting elite interviews. *Qualitative Research*, 11(4), 431-441.
- Haughey, M., & Muirhead, W. (1999). *On-line learning: Best practices for Alberta school jurisdictions*. Edmonton, Alberta: Alberta Department of Education. Retrieved from <https://files.eric.ed.gov/fulltext/ED438798.pdf>
- Hawkins, A., Graham, C. R. & Barbour, M. K. (2012). "Everybody is their own island": Teacher disconnection in a virtual school. *The International Review of Research in Open and Distance Education*, 13(2), 123-144.
- Herzog, M. J., & Pittman, R. B. (1995). Home, family, and community: Ingredients in the rural education equation. *Phi Delta Kappan*, 77, 113-118.
- Herring, M. C. (2004). Development of constructivist-based distance learning environments: A knowledge base for k-12 teachers. *The Quarterly Review of Distance Education*, 5(4), 231-242.
- Hobbs, V. (2004). *The promise and the power of online learning in rural education*. Arlington, VA: Rural School and Community Trust.

Holloway, D. L. (2002). Using research to ensure quality teaching in rural schools.

*Journal of Research in Rural Education*, 17(3). Retrieved from

[http://sites.psu.edu/jrre/wp-content/uploads/sites/6347/2014/02/17-3\\_2.pdf](http://sites.psu.edu/jrre/wp-content/uploads/sites/6347/2014/02/17-3_2.pdf)

Holloway, I., & Biley, F. C. (2011). Being a qualitative researcher. *Qualitative Health*

*Research*, 21(7), 968-975.

Horn, M. and Staker, H. (2011). *The rise of k-12 blended learning*. Retrieved from

<https://www.christenseninstitute.org/wp-content/uploads/2013/04/The-rise-of-K-12-blended-learning.pdf>

Hughes, J. E., McLeod, S., Brown, R., Maeda, Y., & Choi, J. (2005). *Staff development*

*and student perceptions of the learning environment in virtual and traditional*

*secondary schools*. Naperville, IL: North Central Regional Educational

Laboratory, Learning Point Associates.

Huang, X., Dedegikas, C., & Walls, J. (2011). Using multimedia technology to teach

Modern Greek language online in China: Development, implementation, and

evaluation. *European Journal of Open, Distance and E Learning*, 2011(1).

International Association for K-12 Online Learning. (2011). *The Online Learning:*

*Definitions Project*. Retrieved from [http://www.inacol.org/wp-](http://www.inacol.org/wp-content/uploads/2015/02/iNACOL_DefinitionsProject.pdf)

[content/uploads/2015/02/iNACOL\\_DefinitionsProject.pdf](http://www.inacol.org/wp-content/uploads/2015/02/iNACOL_DefinitionsProject.pdf)

Irvin, M. J., Hannum, W. H., Farmer, T. W., de la Varre, C., & Keane, J. (2009).

Supporting online learning for advanced placement students in small rural schools: Conceptual foundations and intervention components of the facilitator preparation program. *Rural Educator*, 31(1), 29-37.

Irvin, M. J., Hannum, W. H., Varre, C. d. l., & Farmer, T. W. (2010). Barriers to distance education in rural schools. *Quarterly Review of Distance Education*, 11(2), 73-90.

Jimerson, L. (2006). *Breaking the fall: Cushioning the impact of rural declining enrollment*. Arlington, VA: The Rural School and Community Trust.

Johnson, J., & Strange, M. (2007). *Why rural matters 2007: The realities of rural education growth*. Arlington, VA: The Rural School and Community Trust.

Johnson, T.D. (2011). Perceptions of distance education in Newfoundland and Labrador: 1999 - 2009. St. John's, NL: Killick Centre for E-Learning Research, pp.1-80.

Kargozari, H.R. & Ghaemi, H. (2011). Web-based writing instruction and enhancing EFL learners' writing quality. *Turkish Online Journal of Distance Education*, 12(3), 36-45.

Kellogg, L., & Politoski, K. (2002). *Virtual schools across America: Trends in k-12 online education*. Los Angeles, CA: Peak Group Research Corporation.

Kennedy, K. & Archambault, L. (2012). Offering preservice teachers field experiences in k-12 online learning. *Journal of Teacher Education*, 63(3), 185-200.

- Kirby, D., Sharpe, D., Bourgeois, M., & Greene, M. (2010). Graduates of the new learning environment: A follow-up study of high school distance e-learners. *Quarterly Review of Distance Education*, 11(3), 161-173.
- Kozma, R. (1991). Learning with media. *Review of Educational Research*, 61(2), 179-211.
- Kozma, R., Zucker, A., & Espinoza, C. (1998). *An evaluation of the Virtual High School after one year of operation*. Arlington, VA: SRI International. Retrieved from <http://staging.vhs.webstagingserver.com/sites/default/files/public/Evaluation%20after%20yr%201.pdf>
- Kvale, S. (1996). *Interviews: An Introduction to Qualitative Research Interviewing*. Thousand Oaks, CA: Sage.
- Laing, T. (2010). Virtual learning: A solution to the all-black male school debate and the challenge of black male k-12 outcomes. *Journal of African American Males in Education*, 1(3), 212-230.
- LaPadula, M. (2003). A comprehensive look at online student support services for distance learners. *The American Journal of Distance Education*, 17(2), 119–128.
- Lee, M. & Figueroa, R. (2012). Internal and external indicators of virtual learning success: A guide to success in k-12 virtual learning. *Distance Learning*, 9(1), 21-28.



- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic Inquiry*. Beverly Hills, CA: Sage.
- Lowe, J. M. (2006). Rural education: Attracting and retaining teachers in small schools. *Rural Educator*, 27(2), 28-32.
- Macpherson, I., Brooker, R., & Ainsworth, P. (2000). Case study in the contemporary world of research: Using notions of purpose, place, process and product to develop some principles for practice. *International Journal of Social Research Methodology*, 3(1), 49-61.
- Malecki, E. J. (2003). Digital development in rural areas: Potentials and pitfalls. *Journal of Rural Studies*, 19(2), 201–214.
- McLeod, S., Hughes, J. E., Brown, R., Choi, J., & Maeda, Y (2005). *Algebra achievement in virtual and traditional schools*. Naperville, IL: Learning Point.
- McMillan, J. H., & Wergin, J. F. (2002). *Understanding and evaluating educational research*. New Jersey: Merrill Prentice-Hall.
- McQuadi, S. (2009). Making education equitable in rural China through distance learning. *International Review of Research in Open and Distance Learning*, 10(1), 1-21.
- Merriam, S. B. (1988). *Case study research in education: A qualitative approach*. San Francisco: Jossey-Bass.
- Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative Research: A guide to design and implementation*. San Francisco: Jossey-Bass.

- Mills, S. C. (2003). Implementing online secondary education: An evaluation of a virtual high school. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference 2003* (pp.444–451). Norfolk, VA: AACE.
- Molnar, A. (Ed.); Huerta, L., Shafer, S. R., Barbour, M.K., Miron, G., Gulosino, C. (2015). *Virtual schools in the U.S. 2015: Politics, performance, policy, and research evidence*. Boulder, CO: National Education Policy Center. Retrieved from <http://nepc.colorado.edu/publication/virtual-schools-annual-2015>.
- Monk, D. H. (2007). Recruiting and retaining high quality teachers in rural areas. *The Future of Children*, 17(1), 155–174.
- Moore, M. G. & Kearsley, G. (1996). *Distance education: A systems view*. Belmont, CA: Wadsworth.
- Mulcahy, D. M. (2002). Re-conceptualizing distance education: Implications for the rural schools of Newfoundland and Labrador. *The Morning Watch*, 30(1-2). Retrieved from <http://www.mun.ca/educ/faculty/mwatch/fall02/Mulcahy.htm>
- Mulcahy, D. M. (2007a). Current issues in rural education in Newfoundland and Labrador. *Education in Rural Australia*, 17(1), 17-39.
- Mulcahy, D. M. (2007b). What does the future hold for rural schools and rural communities? *The Morning Watch*, 35(3-4), 1-24. Retrieved from <http://www.mun.ca/educ/faculty/mwatch/win07.html>

Mulcahy, D. M., Dibbon, D., & Norberg, C. (2008). *An investigation into the nature of education in a rural and remote region of Newfoundland and Labrador: The Straits*. St. John's, NL: Harris Centre, Memorial University of Newfoundland.

National Center for Education Statistics. (1999). *Distance education in postsecondary education institutions 1997-1998*. Retrieved from <http://www.nyu.edu/classes/jepsen/ncesDec99.pdf>

O'Toole, J., & Beckett, D. (2010). *Educational research: Creative thinking & doing*. Oxford University Press, USA.

Palloff, R. M., & Pratt, K. (2007). *Building online learning communities: Effective strategies for the virtual classroom*. San Francisco, CA: Jossey-Bass.

Patrick, S., & Powell, A. (2006). *An international perspective of k-12 online learning: A summary of the 2006 NACOL international e-learning survey*. North American Council for Online Learning. Retrieved from <http://www.inacol.org/wp-content/uploads/2015/02/an-international-perspective.pdf>

Patrick, S., Myers, J., Silverstein, J., Brown, A., & Watson, J. (2015). *Performance-based funding & online learning: Maximizing resources for student success*. Vienna, VA: International Association for K-12 Online Learning. Retrieved from <https://www.inacol.org/wpcontent/uploads/2015/03/iNACOL-Performance-Based-Funding-and-Online-Learning.pdf>

- Philpott, D., Sharpe, D., & Neville, R. (2009). The effectiveness of web-delivered learning with aboriginal students: Findings from a study in coastal Labrador. *Canadian Journal of Learning and Technology/La revue canadienne de l'apprentissage et de la technologie*, 35(3), 1.
- Picciano, A., & Seaman, J. (2009). *K-12 online learning: A 2008 follow-up of the survey of U.S. school district administrators*. Needham, MA: Sloan Consortium.
- Rice, K. L. (2006). A comprehensive look at distance education in the k-12 context. *Journal of Research on Technology in Education*, 38(4), 425-448.
- Rice, K. L. (2009). Priorities in k-12 distance education: A Delphi study examining multiple perspectives on policy, practice, and research. *Educational Technology & Society*, 12(3), 163–177.
- Rice, K. (2012). *Making the move to k-12 online teaching: Research-based strategies and practices*. Boston: Pearson.
- Roblyer, M. D. (2005). Who plays well in the virtual sandbox? Characteristics of successful online students and teachers. *SIGTel Bulletin*, (2).
- Roblyer, M. D. (2006). Virtually successful: Defeating the dropout problem through online school programs. *Phi Delta Kappan*, 88(1), 31-36.
- Roblyer, M. D., & Davis, L. (2008). Predicting success for virtual school students: Putting research-based models into practice. *Online Journal of Distance Learning Administration*, 11(4).

- Roblyer, M. D., Davis, L., Mills, S. C., Marshall, J., & Pape, L. (2008). Toward practical procedures for predicting and promoting success in virtual school students. *American Journal of Distance Education*, 22(2), 90-109.  
doi: 10.1080/08923640802039040
- Roblyer, M. D., Freeman, J., Stabler, M., & Schneidmiller, J. (2007). *External evaluation of the Alabama ACCESS initiative phase 3 report*. Retrieved from <http://accessdl.state.al.us/2006Evaluation.pdf>
- Ronsisvalle, T., & Watkins, R. (2005). Student success in online k-12 education. *Quarterly Review of Distance Education*, 6(2), 117-124.
- Roulston, K. (2010). Considering quality in qualitative interviewing. *Qualitative Research*, 10(2), 199-228.
- Saba, F. (2005). Critical issues in distance education: A report from the United States. *Distance Education*, 26(2), 255-272.
- Saldaña, J. (2015). *The coding manual for qualitative researchers*. London; Thousand Oaks, CA: Sage.
- Schlosser, L., & Simonson, M. (2002). *Distance education: Definition and glossary of terms*. Bloomington, IN: Association for Educational Communication[s] and Technology.
- Scott, D. & Usher, R. (2011). *Researching education*. London; New York: Continuum.

- Seidman, I. (2013). *Interviewing as qualitative research: A guide for researchers in education and the social sciences*. New York: Teachers College Press.
- Seifert, T., Sheppard, B., & Vaughan, A. M. (2009). Examining the effectiveness of distance education: Results from multi-level and multilevel mixture modeling. In András Szűcs, Alan Tait, Martine Vidal, & Ulrich Bernath (Eds.). *Distance and e-learning in transition: Learning innovation, technology and social challenges* (141-150). London; Hoboken, NJ: ISTE; John Wiley & Sons.
- Setzer, C. J., & Lewis, L. (2005). *Distance education courses for public elementary and secondary school students: 2002–2003 (No. NCES 2005-010)*. Washington, DC: National Center for Education Statistics.
- Siaciwen, R. & Lubinda, F. (2008). The role of open and distance learning in the implementation of the right to education in Zambia. *International Review of Research in Open and Distance Learning*, 9(1), 1-14.
- Siegel, H. (2006). Epistemological diversity and education research: Much ado about nothing much? *Educational Researcher*, 35(2), 3-12.
- Sikwibele, A.L., & Mungoo, J.K. (2009). Distance learning and teacher education in Botswana: Opportunities and challenges. *International Review of Research in Open and Distance Learning*, 10(4), 1-16.
- Smith, R., Clark, T., & Blomeyer, R. L. (2005). *A synthesis of new research on k–12 online learning*. Naperville, IL: Learning Point Associates.

- Smith, K., & Northrop, K. (1998). *The CLASS Course Design Model for Web-Based Instruction*. Retrieved from <https://eric.ed.gov/?id=ED422877>
- Sobin, C., Weissman, M.M., Goldstein, R.B., Adams, P., Wickramaratne P., Warner V. & Lish J.D. (1993). Diagnostic interviewing for family studies: Comparing telephone and face-to-face methods for the diagnosis of lifetime psychiatric disorders, *Psychiatric Genetics* 3(4): 227–333.
- Sparkes, R. & Williams, L. (2000). *Supporting learning: Ministerial panel on educational delivery in the classroom*. St. John's, Nfld: Government of Newfoundland and Labrador.
- Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.
- Stake, R. E. (2010). *Qualitative research: Studying how things work*. Guilford Press. New York: Guildford Press.
- Stevens, K. (2006). Rural schools as regional centres of e-learning and the management of digital knowledge: The case of Newfoundland and Labrador. *International Journal of Education & Development using Information & Communication Technology*, 2(4), 119-127.
- Stevens, K. (2008). Collaborative professional education for e-teaching in networked schools. *International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering* 2(2). 85-89.

Stevens, K. (2013). Technology Mediated Learning to Sustain Rural Schools: Personal Reflections on an e-Learning Project. *Morning Watch* 41(1-2), 1-6.

Sturges, J. E., & Hanrahan, K. J. (2004). Comparing telephone and face-to-face qualitative interviewing: A research note. *Qualitative Research*, 4(1), 107-118.

Tausig, J.E. & Freeman, E.W. (1988). The next best thing to being there: Conducting the clinical research interview by telephone. *American Journal of Orthopsychiatry*, 58(3), 418-427.

Trier-Bieniek, A. (2012). Framing the telephone interview as a participant-centred tool for qualitative research: A methodological discussion. *Qualitative Research*, 12(6), 630-644.

Tucker, B. (2007). *Laboratories of reform: Virtual high schools and innovation in public education*. Washington, DC: Education Sector.

Walford, G. (2007). Classification and framing of interviews in ethnographic interviewing. *Ethnography and Education*, 2(2), 145-157.

Watson, J. A., Murin, Vashaw, L., Gemin, B., & Rapp, C. (2011). *Keeping pace with k-12 online learning*. Vienna, VA: Evergreen Education Group.

Watson, J. A., Murin, Vashaw, L., Gemin, B., & Rapp, C. (2013). *Keeping pace with k-12 online learning: An annual review of policy and practice*. Vienna, VA: Evergreen Education Group.



- Watson, J. F., Winograd, K., & Kalmon, S. (2004). *Keeping pace with k-12 online learning: A snapshot of state-level policy and practice*. Naperville, IL: North Central Regional Educational Laboratory, Learning Point Associates. Retrieved from <http://www.ncrel.org/tech/pace/index.html>.
- Weiner, C. (2003, July-September). Key ingredients to online learning: Adolescent students study in cyberspace. *International Journal on E-Learning*, 2(3), 44-50.
- Yates, J. M. (2003). *Interactive distance learning in prek-12 settings: A handbook of possibilities*. Westport, CT; London: Libraries Unlimited.
- Yin, R. (1993). *Applications of case study research*. Newbury Park, CA: Sage Publications.
- Yin, R. K. (2003). *Case study research: Design and methods* (3<sup>rd</sup> ed.). Thousand Oaks, CA: Sage Publications.

## Appendices

### Appendix A: Letter to the Director of CDLI

Feb 15, 2016  
Mr. Jim Tuff  
Director  
Centre for Distance Learning and Innovation

Dear Mr. Tuff,

I am a PhD student in the Faculty of Education, Memorial University, working under the supervision of Dr. Dennis Mulcahy.

The focus of my dissertation research is the Centre for Distance Learning and Innovation (CDLI). The tentative title of my thesis is "Provision of a comprehensive curriculum to rural high school students through technology: A case study of a provincial virtual school in Canada".

The purpose of this qualitative project is to describe the development of CDLI from its beginnings in 2000 to the present day. The study will investigate all aspects of this development including technical as well as the pedagogical challenges, issues related to e-teacher recruitment and training, and relationships between CDLI and participating schools.

Knowledge and information generated from this study may be beneficial for other researchers, policy makers, communities and CDLI personnel.

The purpose of this letter, Mr. Tuff, is to request your and CDLI's endorsement and assistance with my dissertation research.

The primary method I will be using to collect data for this project will be through interviews with CDLI personnel including management, e-teachers, and technical support persons. I have included in this email an invitation to participate. With your permission I will send this to all CDLI personnel. I am assuming that all email addresses can be found on the CDLI website.

Participants' participation is completely voluntary. Each participant will make their own independent decision as to whether or not they would like to be involved. All participants will be informed and reminded of their rights to participate or withdraw before any interview, or at any time in the study. The participants will be interviewed on characteristics and functions of CDLI, its history, background and its current status. The

participants will be interviewed approximately for one to two hours. Then, there may be an hour for a follow up interview. Therefore, a total of three hours commitment is required from them for this data collection process. They will be interviewed at MUN offices or in a private room.

To support the findings of this study, quotations and excerpts from the interviews may be used and labelled with pseudonyms to protect the identity of the participants. Names of participants will not appear in the thesis or reports resulting from this study. Participants will not be identifiable, and only described by gender.

All data collected will be retained locked in my office and in a secure cabinet in the Faculty of Education at Memorial University. Only myself will have access to this material.

If you have any questions regarding this study or would like additional information to assist you in reaching a decision about participation, please contact me at [nadeems@mun.ca](mailto:nadeems@mun.ca). You may also contact my supervisor, Dr. Dennis Mulcahy at [dmulcahy@mun.ca](mailto:dmulcahy@mun.ca).

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research, such as the way you have been treated or your rights as a participant, you may contact the Chairperson of the ICEHR at [icehr@mun.ca](mailto:icehr@mun.ca) or by telephone at 709-864-2861.

I hope that the results of my study will be beneficial to the CDLI, participants, and to the communities across Canada, as well as the broader research community. I very much look forward to speaking with you and thank you in advance for your assistance with this project.

Yours sincerely,

Nadeem Saqlain  
Ph.D. Candidate  
Faculty of Education  
Memorial University of Newfoundland

## Appendix B: Letter to the participants

Hello,

My name is Nadeem Saqlain and I am a PhD student working under the supervision of Dr. Dennis Mulcahy in the Faculty of Education at Memorial University. The reason that I am contacting you is that I am conducting a study on Centre for Distance Learning and Innovation (CDLI). **The title of my research project is “Provision of a comprehensive curriculum to rural high school students through technology: A Case study of a provincial virtual school in Canada”.** I am currently seeking volunteers from the CDLI's former and present employees as participants in this study.

The purpose of this qualitative project is to describe the development of CDLI from its beginnings in 2000 to the present day. The study will investigate all aspects of this development including technical as well as the pedagogical challenges, issues related to e-teacher recruitment and training, and relationships between CDLI and participating schools.

Knowledge and information generated from this study may be beneficial for other researchers, policy makers, communities and CDLI personnel.

Participants' participation is completely voluntary. Each participant will make their own independent decision as to whether or not they would like to be involved. All participants will be informed and reminded of their rights to participate or withdraw before any interview, or at any time in the study. Each participant will be interviewed for one to two hours. Then, the participant may be interviewed again for an hour follow up. The study is not being conducted on behalf of CDLI, nor is it a condition of employment.

I would like to assure you that this study has been reviewed and received ethics clearance through a Memorial University Ethics Committee. However, the final decision about participation belongs to the CDLI. There are minimal anticipated risks to participants in this study. If you have any questions regarding this study or would like additional information to assist you in reaching a decision about participation, please contact me at [nadeems@mun.ca](mailto:nadeems@mun.ca). You may also contact my supervisor, Dr. Dennis Mulcahy at [dmulcahy@mun.ca](mailto:dmulcahy@mun.ca). I hope that the results of my study will be beneficial to the CDLI, participants, and to the communities across Canada, as well as the broader research community.

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research, such as the way you have been treated or your rights as a participant, you may contact the Chairperson of the ICEHR at [icehr@mun.ca](mailto:icehr@mun.ca) or by telephone at 709-864-2861.

If you are interested in participating, please contact me at **nadeems@mun.ca**. I will send you informed consent form. I will also send you details regarding the interview.

I look forward to hearing from you.

Sincerely,

Nadeem Saqlain  
Ph.D. Candidate  
Faculty of Education  
Memorial University of Newfoundland

## Appendix C: Informed Consent form

**Informed Consent Form**

**Title: Provision of a comprehensive curriculum to rural high school students through technology: A case study of a provincial virtual school in Canada**

Researcher(s): Nadeem Saqlain, Ph.D. Candidate, Faculty of Education, Memorial University of Newfoundland. E-mail: nadeems@mun.ca

Supervisor(s): Dr. Dennis Mulcahy, Faculty of Education, Memorial University of Newfoundland. E-mail: dmulcahy@mun.ca

You are invited to take part in a research project entitled "Provision of a comprehensive curriculum to rural high school students through technology: A case study of a provincial virtual school in Canada"

This form is part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. It also describes your right to withdraw from the study. In order to decide whether you wish to participate in this research study, you should understand enough about its risks and benefits to be able to make an informed decision. This is the informed consent process. Take time to read this carefully and to understand the information given to you. Please contact the researcher, *Nadeem Saqlain*, if you have any questions about the study or would like more information before you consent.

It is entirely up to you to decide whether to take part in this research. If you choose not to take part in this research or if you decide to withdraw from the research once it has started, there will be no negative consequences for you, now or in the future.

**Introduction:**

I am a doctoral student at the Faculty of Education, Memorial University of Newfoundland. As a part of my doctoral dissertation. I am conducting research under the supervision of Dr. Dennis Mulcahy.

**Purpose of study:**

The Centre for Distance Learning & Innovation (CDLI), a province wide virtual school, was established in December, 2000. Its purpose was to provide educational programming to the small rural high schools in Newfoundland and Labrador via the Internet. Its goal was to equalize educational opportunities for rural students. The purpose of this research project is to investigate CDLI's degree of success in reducing the educational inequality that has traditionally plagued rural schools in Newfoundland and Labrador.

**What you will do in this study:**

You will be interviewed on characteristics and functions of CDLI, its history, background, and its current status. The interviews will be conducted at a neutral location such as on campus.

**Length of time:**

You will be interviewed approximately for one to two hours. Then, there may be an hour for a follow up interview. Therefore, a total of three hours commitment is required from you for this data collection process.

**Withdrawal from the study:**

- You are free to withdraw anytime from the study.
- Your withdrawal will not have any consequences on you.
- After collecting the data and after the follow up interviews on April 30, 2016 all collected data will be used in the study unless the participants withdraw from the research before the end of the follow up interviews (April 30, 2016). After that point, the collected data cannot be withdrawn from the research study.

**Possible benefits:**

- a) The participants will be provided an opportunity to review and reflect on the development and the contribution of CDLI in Newfoundland and Labrador.
- b) The results can be beneficial for the community. It will determine how effective CDLI has been in developing an online pedagogy making use of both synchronous and asynchronous communication and an online course design that is responsive to not just an elite group but all student ability levels.
- c) The results of this study may be useful to rural researchers and educators who may be interested in the use of eLearning to effectively respond to the traditional educational inequality that is characteristic of small rural schools in remote and isolated places. Also, this may be effective and useful knowledge, and provide insight for others working in similar contexts and with similar challenges in other parts of the world.

**Possible risks:**

The study involves social and employment-related risks such as if the organization discovered that an employee revealed serious issues with the way the system is administered, or provided other sensitive and /or controversial views or information, there could be potential job risks to that employee. The researcher will use fictitious names in order to conceal the participants' identities. The participants will also be given the option to review their interview transcripts and redact or change it if they wish.

**Confidentiality:**

The ethical duty of confidentiality includes safeguarding participants' identities, personal information, and data from unauthorized access, use, or disclosure.

I will respect your privacy. First, I will accept your consent form. Then, I will interview you at your convenience. I will not ask personal or irrelevant questions. The names and addresses of the participants will be removed from the data. Instead, fictitious names will be used.

**Anonymity:**

Anonymity refers to the protection of participants' identifying characteristics, such as name or description of physical appearance.

I will use fictitious names and I will also hide all the physical features of the participants. However, since CDLI is the only virtual school in the province. It may be difficult to fully conceal the identity of the participants.

**Recording of Data:**

Your interview will be audio recorded. Then, I will transcribe those recordings. Please indicate if you are uncomfortable with audio recordings.

**Storage of Data:**

- The data will be stored on a hard drive and in a USB stick.
- Electronic data will be stored on password-protected devices.
- The data will be stored in a locked filing cabinet. Consent forms will be stored separately from the data.
- Only the researcher and my supervisor will have access to the data.
- The data will be stored for five years.

- The data will not be archived. If there is a need to archive the data, I will ask your consent to archive the data.

**Reporting of Results:**

The data will be published in a thesis, journal articles, and conference presentation. The thesis will be publically available at the QEII library.

The data will be reported using direct quotations and summarized form.

**Sharing of Results with Participants:**

After the project is complete, you will have access the study results through the QEII library.

**Questions:**

You are welcome to ask questions at any time before, during, or after your participation in this research. If you would like more information about this study, please contact: Nadeem Saqlain, email: [nadeeems@mun.ca](mailto:nadeeems@mun.ca). My supervisor is Dr. Dennis Mulcahy, email: [dmulcahy@mun.ca](mailto:dmulcahy@mun.ca).

The proposal for this research has been reviewed by the Interdisciplinary Committee on Ethics in Human Research and found to be in compliance with Memorial University's ethics policy. If you have ethical concerns about the research, such as the way you have been treated or your rights as a participant, you may contact the Chairperson of the ICEHR at [icehr@mun.ca](mailto:icehr@mun.ca) or by telephone at 709-864-2861.

**Consent:**

Your signature on this form means that:

- You have read the information about the research.
- You have been able to ask questions about this study.
- You are satisfied with the answers to all your questions.
- You understand what the study is about and what you will be doing.
- You understand that you are free to withdraw participation in the study without having to give a reason, and that doing so will not affect you now or in the future.
- You understand that if you choose to end participation **during** data collection, any data collected from you up to that point will be retained by the researcher, unless you indicate otherwise.
- You understand that your data is being collected anonymously and therefore cannot be removed once data collection has ended.



I agree to be audio-recorded

☐ Yes ☐ No

I agree to the use of direct quotations

☐ Yes ☐ No

By signing this form, you do not give up your legal rights and do not release the researchers from their professional responsibilities.

**Your signature confirms:**

☐ I have read what this study is about and understood the risks and benefits. I have had adequate time to think about this and had the opportunity to ask questions and my questions have been answered.

☐ I agree to participate in the research project, understanding the risks and contributions of my participation, that my participation is voluntary, and that I may end my participation.

☐ A copy of this Informed Consent Form has been given to me for my records.

---

Signature of participant

---

Date

**Researcher's Signature:**

I have explained this study to the best of my ability. I invited questions and gave answers. I believe that the participant fully understands what is involved in taking part in the study, any potential risks of the study and that he or she has freely chosen to be in the study.

---

Signature of principal investigator

---

Date

## Appendix D: Interview Questions

### Interview Questions

How long have you been working with CDLI and how have things changed from an organizational standpoint and also from a teaching standpoint?

What is your educational background?

Could you describe your role and responsibilities as a Program Development Specialist-Program Delivery?

Could you describe your daily routine of working with CDLI?

How is working with CDLI different than with traditional schools?

What were the administrative/organizational challenges that you faced and how did you address those challenges?

What are the current challenges?

Did you face any student discipline problem and how did you manage that?

Could you describe your experience of evaluation of your teachers' performance?

Could you describe your experience of reviewing and policies and procedures?

What is your role in creating schedules? Do/did you face any challenges?

Could you describe your experience of dealing with parents and community?

How is CDLI funded?

What is the current picture of CDLI in terms of course offerings, student enrolment, schools, and staff?

How are students selected for CDLI courses?

What are the preferred characteristics of potential e-learners?

How much school-based support is available for CDLI courses and how much is needed?

How are E-teachers recruited and trained?

Do E-teachers get any professional development?

What technological tools and software are used by CDLI?

Could you describe your experience of using synchronous and asynchronous modes of delivery?

How are courses designed and developed?

How do you deal with diverse learners?

Do students drop out in CDLI courses?

How are students assessed?

How are labs done?

What are the preferred characteristics of E-teachers?

How might CDLI be improved?

What can people from other parts of Canada or the world learn from CDLI?

Would you like to add anything?

## Appendix E: Documents for analysis

**Documents**

Barbour, M. (2005). From telematics to web-based: The progression of distance education in Newfoundland and Labrador. *British Journal of Educational Technology*, 36(6), 1055-1058.

Barbour, M. K. (2007). Portrait of rural virtual schooling. *Canadian Journal of Educational Administration and Policy*, 59, 1-21.

Barbour, M. K. & Mulcahy, D. (2004). The role of mediating teachers in Newfoundland's new model of distance education. *The Morning Watch*, 32(1-2). Retrieved from <http://www.mun.ca/educ/faculty/mwatch/fall4/barbourmulcahy.htm>

Barbour, M. K. & Mulcahy, D. M. (2009). Beyond volunteerism and good will: Examining the commitment of schoolbased teachers to distance education. *Education Faculty Publications*. Paper 177. Retrieved from [http://digitalcommons.sacredheart.edu/cgi/viewcontent.cgi?article=1179&context=ced\\_fac](http://digitalcommons.sacredheart.edu/cgi/viewcontent.cgi?article=1179&context=ced_fac)

Barry, M. (2013, February 18). Not banjaxed ...yet: Give it time. Retrieved from <https://mauriceabarry.wordpress.com/2013/02/18/distance-education-in-nl-part-1-the-setting/>

Boone, W. (2008). *The evolution of e-learning in small rural schools in Newfoundland and Labrador*. Killick Centre for E-learning Research. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.536.8895&rep=rep1&type=pdf>

Center for Distance Learning & Innovation (2014). *About Us*. Retrieved from <https://www.cdli.ca/about-us.html>

Sparkes, R. & Williams, L. (2000). Supporting learning: Ministerial panel on educational delivery in the class room. St. John's, Nfld: Government of Newfoundland and Labrador.

## Appendix F: Research Ethics Approval Letter



**Interdisciplinary Committee on  
Ethics in Human Research (ICEHR)**

St. John's, NL Canada A1C 5S7  
Tel: 709 864-2561, icehr@mun.ca  
[www.mun.ca/research/ethics/humans/icehr](http://www.mun.ca/research/ethics/humans/icehr)

ICEHR Number:	<b>20161624-ED</b>
Approval Period:	January 29, 2016 – January 31, 2017
Funding Source:	SSHRC [Sought]
Responsible Faculty:	Dr. Dennis Mulcahy Faculty of Education
Title of Project:	<i>Provision of a comprehensive curriculum to rural high school students through technology: A historical study of a provincial virtual school in Canada</i>

January 29, 2016

Mr. Nadeem Saqlain  
Faculty of Education  
Memorial University of Newfoundland

Dear Mr. Saqlain:

Thank you for your email correspondence of January 21 and 27, 2016 addressing the issues raised by the Interdisciplinary Committee on Ethics in Human Research (ICEHR) concerning the above-named research project.

The ICEHR has re-examined the proposal with the clarification and revisions submitted, and is satisfied that the concerns raised by the Committee have been adequately addressed. In accordance with the *Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans (TCPS2)*, the project has been granted *full ethics clearance* to January 31, 2017. ICEHR approval applies to the ethical acceptability of the research, as per Article 6.3 of the *TCPS2*. Researchers are responsible for adherence to any other relevant University policies and/or funded or non-funded agreements that may be associated with the project.

If you need to make changes during the course of the project, which may raise ethical concerns, please complete the amendment request event form using Memorial's Researcher Portal for the Committee's consideration.

The *TCPS2* requires that you submit an annual update form to the ICEHR before January 31, 2017. If you plan to continue the project, you need to request renewal of your ethics clearance, and include a brief summary on the progress of your research. When the project no longer requires contact with human participants, is completed and/or terminated, you need to provide the annual update form with a final brief summary, and your file will be closed.

The annual update and amendment request event forms are available by logging in to your Memorial Researcher Portal account.

Yours sincerely,

Kelly Blidook, Ph.D.  
Vice-Chair, Interdisciplinary Committee on  
Ethics in Human Research

KB/lw

cc: Supervisor – Dr. Dennis Mulcahy, Faculty of Education  
Director, Research Grant and Contract Services  
Associate Dean, Graduate Programs, Faculty of Education